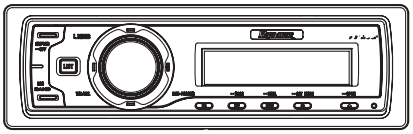
Pioneer sound.vision.soul

Service Manual



DEH-P690UB/XN/UC

ORDER NO.
CRT3883

CD RECEIVER

DEH-P690UB/XN/UC
DEH-P6900UB/XN/UC
DEH-P7950UB/XN/ES

This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech.Module	Remarks
CX-3195	CRT3815	S10.5COMP2	CD Mech. Module : Circuit Descriptions, Mech. Descriptions, Disassembly

For details, refer to "Important Check Points for Good Servicing".

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ⓒ**PIONEER CORPORATION 2007**

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SAFETY INFORMATION

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

This product contains lead in solder and certain electrical parts contain chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm.
Health & Safety Code Section 25249.6 - Proposition 65

● Service Precaution

1. You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.
2. Before disassembling the unit, be sure to turn off the power. Unplugging and plugging the connectors during power-on mode may damage the ICs inside the unit.
3. To protect the pickup unit from electrostatic discharge during servicing, take an appropriate treatment (shorting-solder) by referring to "the DISASSEMBLY".
4. After replacing the pickup unit, be sure to check the grating.
5. Be careful in handling ICs. Some ICs such as MOS type are so fragile that they can be damaged by electrostatic induction.

COMPACT disc DIGITAL AUDIO

COMPACT disc DIGITAL AUDIO TEXT

Plays Windows Media™

[Important Check Points for Good Servicing]

In this manual, procedures that must be performed during repairs are marked with the below symbol.
Please be sure to confirm and follow these procedures.

1. Product safety

Please conform to product regulations (such as safety and radiation regulations), and maintain a safe servicing environment by following the safety instructions described in this manual.

① Use specified parts for repair.

Use genuine parts. Be sure to use important parts for safety.

② Do not perform modifications without proper instructions.

Please follow the specified safety methods when modification(addition/change of parts) is required due to interferences such as radio/TV interference and foreign noise.

③ Make sure the soldering of repaired locations is properly performed.

When you solder while repairing, please be sure that there are no cold solder and other debris.
Soldering should be finished with the proper quantity. (Refer to the example)

④ Make sure the screws are tightly fastened.

Please be sure that all screws are fastened, and that there are no loose screws.

⑤ Make sure each connectors are correctly inserted.

Please be sure that all connectors are inserted, and that there are no imperfect insertion.

⑥ Make sure the wiring cables are set to their original state.

Please replace the wiring and cables to the original state after repairs.
In addition, be sure that there are no pinched wires, etc.

⑦ Make sure screws and soldering scraps do not remain inside the product.

Please check that neither solder debris nor screws remain inside the product.

⑧ There should be no semi-broken wires, scratches, melting, etc. on the coating of the power cord.

Damaged power cords may lead to fire accidents, so please be sure that there are no damages.
If you find a damaged power cord, please exchange it with a suitable one.

⑨ There should be no spark traces or similar marks on the power plug.

When spark traces or similar marks are found on the power supply plug, please check the connection and advise on secure connections and suitable usage. Please exchange the power cord if necessary.

⓪ Safe environment should be secured during servicing.

When you perform repairs, please pay attention to static electricity, furniture, household articles, etc. in order to prevent injuries.
Please pay attention to your surroundings and repair safely.

2. Adjustments

To keep the original performance of the products, optimum adjustments and confirmation of characteristics within specification.
Adjustments should be performed in accordance with the procedures/instructions described in this manual.

3. Lubricants, Glues, and Replacement parts

Use grease and adhesives that are equal to the specified substance.
Make sure the proper amount is applied.

4. Cleaning

For parts that require cleaning, such as optical pickups, tape deck heads, lenses and mirrors used in projection monitors, proper cleaning should be performed to restore their performances.

5. Shipping mode and Shipping screws

To protect products from damages or failures during transit, the shipping mode should be set or the shipping screws should be installed before shipment. Please be sure to follow this method especially if it is specified in this manual.

CONTENTS

SAFETY INFORMATION 2
1. SPECIFICATIONS 5
2. EXPLODED VIEWS AND PARTS LIST 8
2.1 PACKING 8
2.2 EXTERIOR(1) 10
2.3 EXTERIOR(2) 13
2.4 CD MECHANISM MODULE 14
3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM 16
3.1 BLOCK DIAGRAM 16
3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE) 18
3.3 KEYBOARD UNIT 24
3.4 CD MECHANISM MODULE(GUIDE PAGE) 26
4. PCB CONNECTION DIAGRAM 34
4.1 TUNER AMP UNIT 34
4.2 KEYBOARD UNIT 38
4.4 CD CORE UNIT(S10.5COMP2) 40
4.3 SWITCH UNIT 39
5. ELECTRICAL PARTS LIST 42
6. ADJUSTMENT 50
6.1 CD ADJUSTMENT 50
6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT 52
6.3 ERROR MODE 54
6.4 SYSTEM MICROCOMPUTER TEST PROGRAM 55
6.5 TEST MODE 56
7. GENERAL INFORMATION 57
7.1 DIAGNOSIS 57
7.1.1 DISASSEMBLY 57
7.1.2 CONNECTOR FUNCTION DESCRIPTION 61
7.2 IC 62
7.3 OPERATIONAL FLOW CHART 77
8. OPERATIONS 78

1. SPECIFICATIONS

DEH-P690UB/XN/UC

General

Power source ..... 14.4 V DC (10.8 V to 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption
Backup current ..... 6 mA or less
Dimensions (W × H × D):
DIN
Chassis ..... 178 × 50 × 165 mm (7 × 2 × 6-1/2 in.)
Nose ..... 188 × 58 × 16 mm (7-3/8 × 2-1/4 × 5/8 in.)
D
Chassis ..... 178 × 50 × 165 mm (7 × 2 × 6-1/2 in.)
Nose ..... 170 × 45 × 16 mm (6-3/4 × 1-3/4 × 5/8 in.)
Weight ..... 1.5 kg (3.3 lbs)

Audio

Maximum power output ..... 50 W × 4
50 W × 2/4 Ω + 70 W × 1/2 Ω (for subwoofer)
Continuous power output ... 22 W × 4 (50 Hz to 15 000 Hz, 5% THD, 4 Ω load, both channels driven)
Load impedance ..... 4 Ω to 8 Ω × 4
4 Ω to 8 Ω × 2 + 2 Ω × 1
Preout max output level/output impedance 4 V/100Ω
Equalizer (7-Band Graphic Equalizer):
Frequency ..... 50/125/315/800/2k/5k/12.5k Hz
Gain ..... ±12 dB
Loudness contour:
Low ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
Mid ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
High ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
HPF:
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –12 dB/oct
Subwoofer (mono):
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –18 dB/oct
Gain ..... +6 dB to –24 dB
Phase ..... Normal/Reverse
Bass boost:
Gain ..... +12 dB to 0 dB

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format:
Sampling frequency ..... 44.1 kHz
Number of quantization bits ..... 16; linear
Frequency characteristics ... 5 Hz to 20 000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)
MP3 decoding format ..... MPEG-1 & 2 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)
WAV signal format ..... Linear PCM & MS ADPCM

USB

Specification ..... USB 2.0 full speed
Supply current ..... 500 mA
Maximum amount of memory ..... 250 GB
File system FAT12, FAT16, FAT32
MP3 decoding format ..... MPEG-1, 2 & 2.5 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)

FM tuner

Frequency range ..... 87.9 MHz to 107.9 MHz
Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)
Signal-to-noise ratio ..... 75 dB (IHF-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
0.1 % (at 65 dBf, 1 kHz, mono)
Frequency response ..... 30 Hz to 15 000 Hz (±3 dB)
Stereo separation ..... 45 dB (at 65 dBf, 1 kHz)

AM tuner

Frequency range ..... 530 kHz to 1 710 kHz (10 kHz)
Usable sensitivity ..... 18 μV (S/N: 20 dB)
Signal-to-noise ratio ..... 65 dB (IHF-A network)

Note

Specifications and the design are subject to possible modifications without notice due to improvements. ▣

General

Power source ..... 14.4 V DC (10.8 V to 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Backup current..... 6 mA or less
Dimensions (W × H × D):
DIN
Chassis ..... 178 × 50 × 165 mm (7 × 2 × 6-1/2 in.)
Nose ..... 188 × 58 × 16 mm (7-3/8 × 2-1/4 × 5/8 in.)
D
Chassis ..... 178 × 50 × 165 mm (7 × 2 × 6-1/2 in.)
Nose ..... 170 × 45 × 16 mm (6-3/4 × 1-3/4 × 5/8 in.)
Weight ..... 1.5 kg (3.3 lbs)

Audio

Maximum power output ..... 50 W × 4
50 W × 2/4 Ω + 70 W × 1/2 Ω (for subwoofer)
Continuous power output ... 22 W × 4 (50 Hz to 15 000 Hz, 5% THD, 4 Ω load, both channels driven)
Load impedance ..... 4 Ω to 8 Ω × 4
4 Ω to 8 Ω × 2 + 2 Ω × 1
Preout max output level/output impedance 4 V/100Ω
Equalizer (7-Band Graphic Equalizer):
Frequency ..... 50/125/315/800/2k/5k/12.5k Hz
Gain ..... ±12 dB
Loudness contour:
Low ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
Mid ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
High ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
HPF:
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –12 dB/oct
Subwoofer (mono):
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –18 dB/oct
Gain ..... +6 dB to –24 dB
Phase ..... Normal/Reverse
Bass boost:
Gain ..... +12 dB to 0 dB

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format:
Sampling frequency ..... 44.1 kHz
Number of quantization bits ..... 16; linear
Frequency characteristics ... 5 Hz to 20 000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IHF-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)
MP3 decoding format ..... MPEG-1 & 2 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)
WAV signal format ..... Linear PCM & MS ADPCM

USB

Specification ..... USB 2.0 full speed
Supply current ..... 500 mA
Maximum amount of memory ..... 250 GB
File system FAT12, FAT16, FAT32
MP3 decoding format ..... MPEG-1, 2 & 2.5 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)

FM tuner

Frequency range ..... 87.9 MHz to 107.9 MHz
Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)
Signal-to-noise ratio ..... 75 dB (IHF-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
0.1 % (at 65 dBf, 1 kHz, mono)
Frequency response ..... 30 Hz to 15 000 Hz (±3 dB)
Stereo separation ..... 45 dB (at 65 dBf, 1 kHz)

AM tuner

Frequency range ..... 530 kHz to 1 710 kHz (10 kHz)
Usable sensitivity ..... 18 μV (S/N: 20 dB)
Signal-to-noise ratio ..... 65 dB (IHF-A network)

Note

Specifications and the design are subject to possible modifications without notice due to improvements. ■

DEH-P7950UB/XN/ES

General

Rated power source ..... 14.4 V DC
(allowable voltage range: 12.0 V to 14.4 V DC)
Grounding system ..... Negative type
Max. current consumption
..... 10.0 A
Backup current..... 6 mA or less

Dimensions (W × H × D):
DIN
Chassis ..... 178 × 50 × 165 mm
Nose ..... 188 × 58 × 16 mm
D
Chassis ..... 178 × 50 × 165 mm
Nose ..... 170 × 45 × 16 mm
Weight ..... 1.5 kg

Audio

Maximum power output ..... 50 W × 4
50 W × 2/4 Ω + 70 W × 1/2 Ω (for subwoofer)
Continuous power output ... 22 W × 4 (50 Hz to 15 000 Hz, 5% THD, 4 Ω load, both channels driven)
Load impedance ..... 4 Ω to 8 Ω × 4
4 Ω to 8 Ω × 2 + 2 Ω × 1
Preout max output level/output impedance
..... 4 V/100Ω
Equalizer (7-Band Graphic Equalizer):
Frequency ..... 50/125/315/800/2k/5k/12.5k Hz
Gain ..... ±12 dB
Loudness contour:
Low ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
Mid ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
High ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)
HPF:
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –12 dB/oct
Subwoofer (mono):
Frequency ..... 50/63/80/100/125 Hz
Slope ..... –18 dB/oct
Gain ..... +6 dB to –24 dB
Phase ..... Normal/Reverse
Bass boost:
Gain ..... +12 dB to 0 dB

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format:
Sampling frequency ..... 44.1 kHz
Number of quantization bits
..... 16; linear
Frequency characteristics ... 5 Hz to 20 000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IEC-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)
MP3 decoding format ..... MPEG-1 & 2 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)
WAV signal format ..... Linear PCM & MS ADPCM

USB

Specification ..... USB 2.0 full speed
Supply current ..... 500 mA
Maximum amount of memory
..... 250 GB
File system FAT12, FAT16, FAT32
MP3 decoding format ..... MPEG-1, 2 & 2.5 Audio Layer 3
WMA decoding format ..... Ver. 7, 7.1, 8, 9, 10 (2ch audio)
(Windows Media Player)
AAC decoding format ..... MPEG-4 AAC (iTunes® encoded only)

FM tuner

Frequency range ..... 87.5 MHz to 108.0 MHz
Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)
Signal-to-noise ratio ..... 75 dB (IEC-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
0.1 % (at 65 dBf, 1 kHz, mono)
Frequency response ..... 30 Hz to 15 000 Hz (±3 dB)
Stereo separation ..... 45 dB (at 65 dBf, 1 kHz)

AM tuner

Frequency range ..... 531 kHz to 1 602 kHz (9 kHz)
530 kHz to 1 640 kHz (10 kHz)
Usable sensitivity ..... 18 μV (S/N: 20 dB)
Signal-to-noise ratio ..... 65 dB (IEC-A network)

Infrared remote control

Wavelength ..... 940 nm ±50 nm
Output ..... typ; 12 mw/sr per Infrared LED

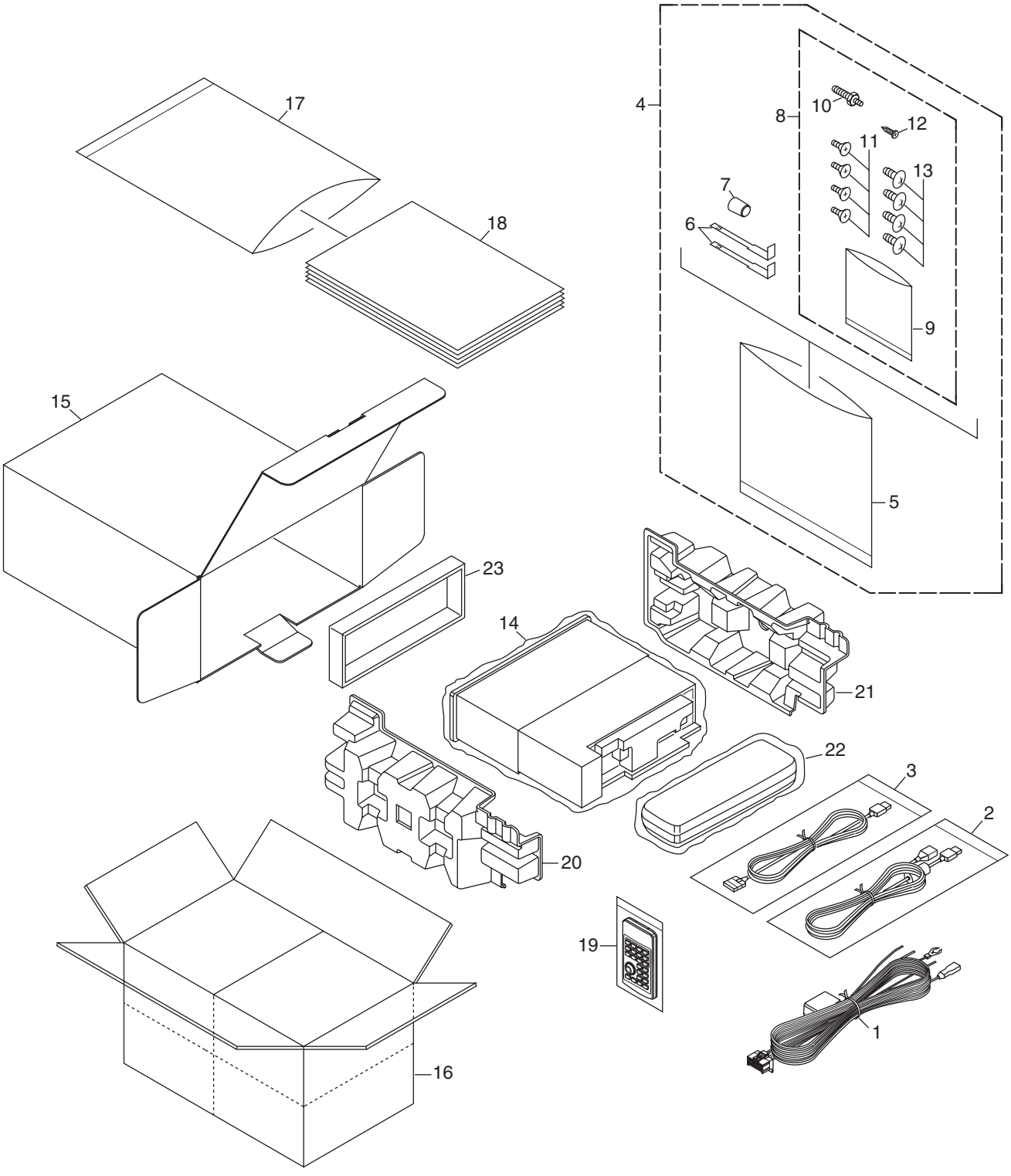
Note

Specifications and the design are subject to possible modifications without notice due to improvements. ■

2. EXPLODED VIEWS AND PARTS LIST

NOTES : • *Parts marked by " * " are generally unavailable because they are not in our Master Spare Parts List.*
• *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
• *Screw adjacent to ▽ mark on the product are used for disassembly.*
• *For the applying amount of lubricants or glue, follow the instructions in this manual. (In the case of no amount instructions,apply as you think it appropriate.)*

2.1 PACKING



(1) PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Cord Assy	CDP1009
	2	Cord Assy	CDP1040
	3	Cord Assy	See Contrast table(2)
*	4	Accessory Assy	See Contrast table(2)
	5	Polyethylene Bag	CEG1160
	6	Handle	CND3707
	7	Bush	CNV3930
	8	Screw Assy	See Contrast table(2)
*	9	Polyethylene Bag	CEG-127
	10	Screw	CBA1650
	11	Screw	CRZ50P090FTC
	12	Screw	See Contrast table(2)
	13	Screw	TRZ50P080FTC
	14	Polyethylene Bag	See Contrast table(2)
	15	Carton	See Contrast table(2)
	16	Contain Box	See Contrast table(2)
	17	Polyethylene Bag	CEG1116
	18-1	Owner's Manual	See Contrast table(2)
	18-2	Owner's Manual	See Contrast table(2)
	18-3	Owner's Manual	See Contrast table(2)
	18-4	Installation Manual	See Contrast table(2)
*	18-5	Caution Card	XRP7002
*	18-6	Caution Card	See Contrast table(2)
	18-7	Caution Card	CRP1310
*	18-8	Warranty Card	See Contrast table(2)
*	18-9	Caution Card	CRP1355
	19	Remote Control Unit	CXC5717
	20	Protector	CHP3373
	21	Protector	CHP3374
	22	Case Assy	XXA7417
	23	Protector	CHP3375

(2) CONTRAST TABLE

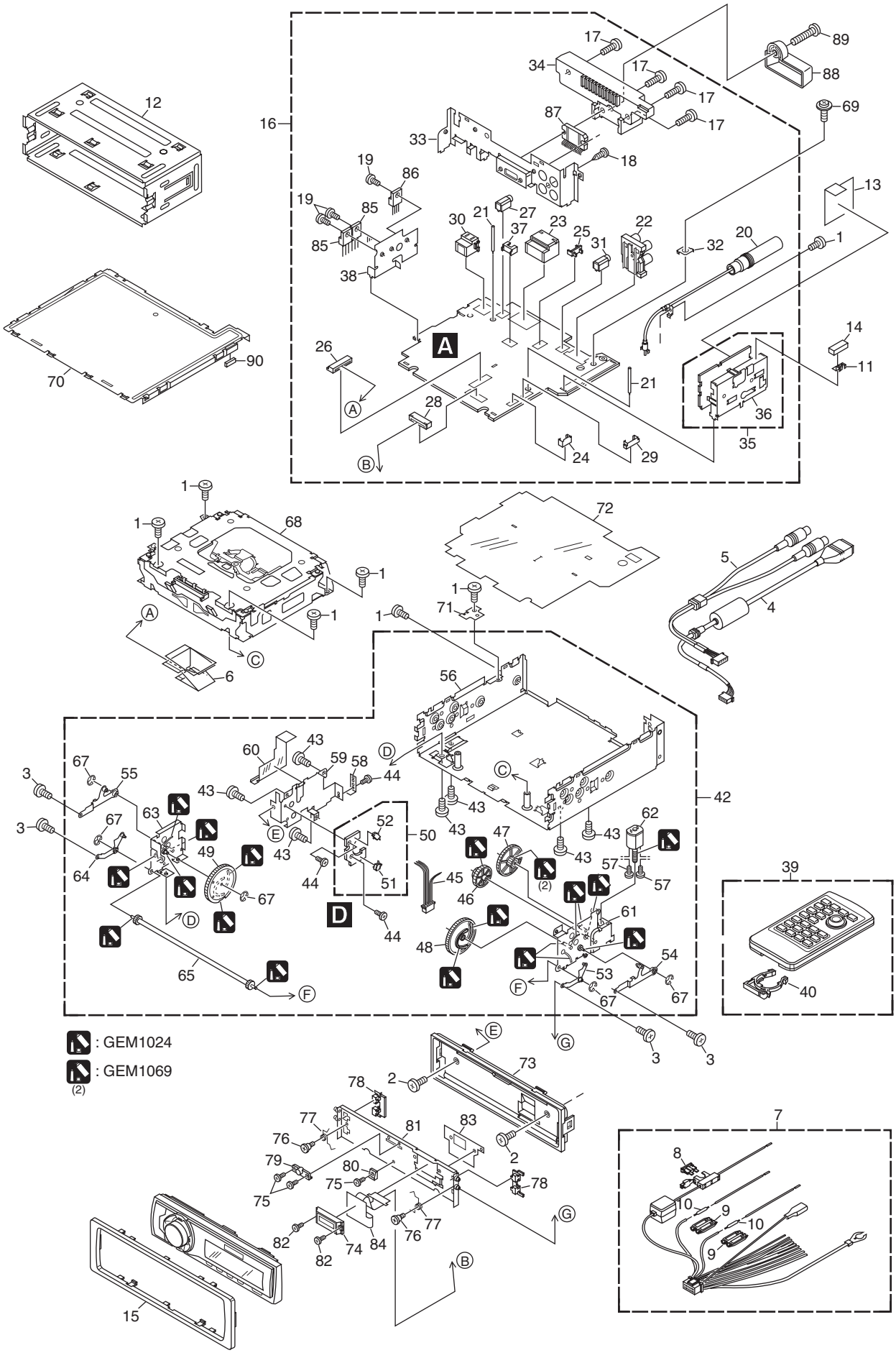
DEH-P690UB/XN/UC , DEH-P6900UB/XN/UC and DEH-P7950UB/XN/ES are constructed the same except for the following:

Mark	No.	Description	DEH-P690UB/XN/UC	DEH-P6900UB/XN/UC	DEH-P7950UB/XN/ES
	3	Cord Assy	CDP1041	Not used	Not used
*	4	Accessory Assy	CEA7316	CEA7316	CEA7317
	8	Screw Assy	CEA5322	CEA5322	CEA3849
	12	Scew	JPZ20P060FTB	JPZ20P060FTB	Not used
	14	Polyethylene Bag	CEG1173	CEG1173	CEG-162
	15	Carton	CHG6077	CHG6079	CHG6078
	16	Contain Box	CHL6077	CHL6079	CHL6078
	18-1	Owner's Manual	CRD4160	CRD4162	CRD4164
	18-2	Owner's Manual	Not used	Not used	CRD4165
	18-3	Owner's Manual	Not used	Not used	CRB2320
	18-4	Installation Manual	CRD4161	CRD4163	CRD4166
*	18-6	Caution Card	Not used	CRP1294	Not used
*	18-8	Warranty Card	CRY1070	CRY1246	Not used

Owner's Manual,Installation Manual

Part No.	Language
CRD4160, CRD4161, CRD4162, CRT4163	English, French
CRD4164	English, Spanish
CRD4165	Portuguese(B), Traditional Chinese
CRB2320	Arabic
CRD4166	English, Spanish, Portuguese(B), Traditional Chinese, Arabic

2.2 EXTERIOR(1)



(1) EXTERIOR(1) SECTION PARTS LIST

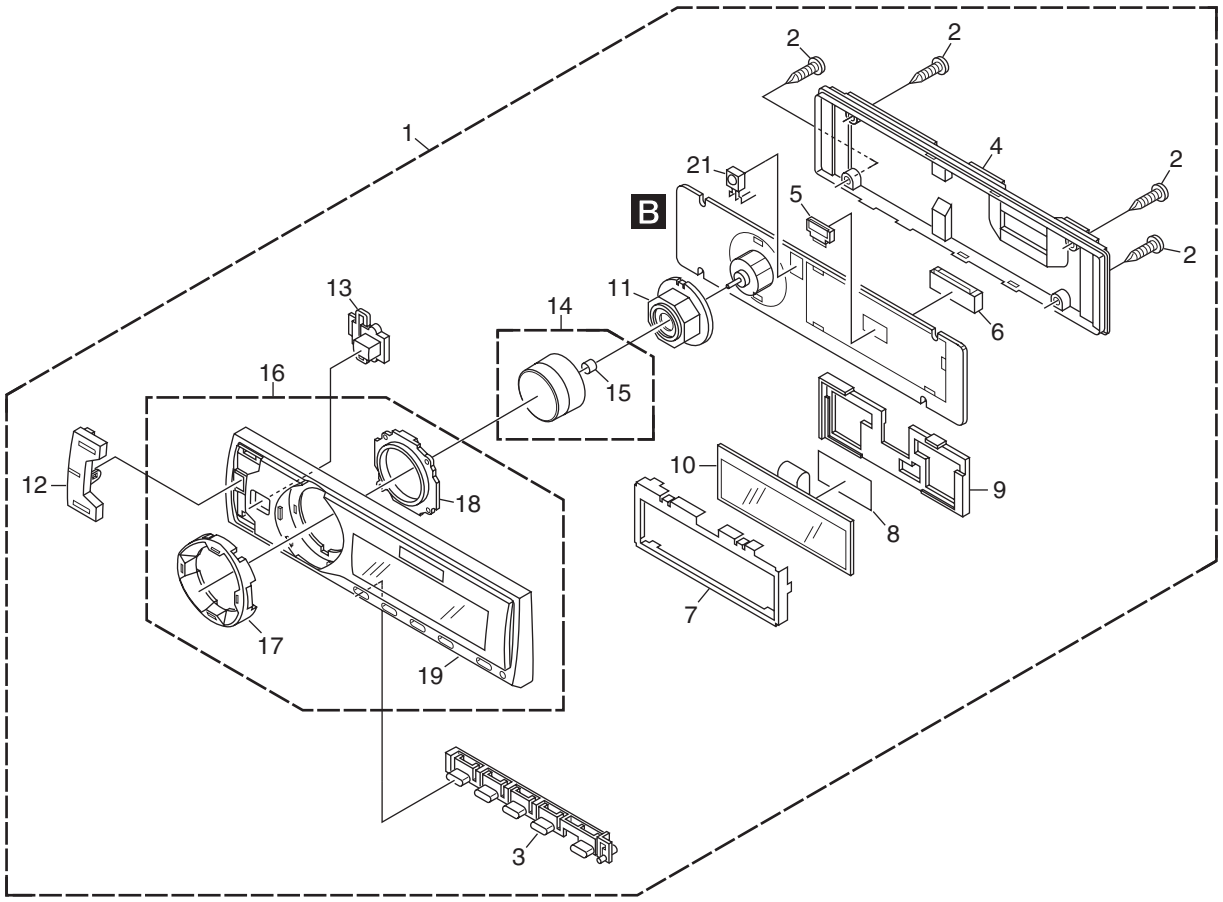
Mark	No.	Description	Part No.
	1	Screw	BSZ26P060FTC
	2	Screw(M2.6 x 4)	CBA1828
	3	Screw(M2 x 2.5)	CBA1924
	4	Cord Assy	CDE8351
	5	Cord Assy	CDE8352
	6	Cable	CDE8355
	7	Cord Assy	CDP1009
⚠	8	Fuse(10 A)	CEK1136
	9	Cap	CNS1472
	10	Resistor	RS1/2PMF102J
	11	Earth Plate	CND2171
	12	Holder	CND3598
	13	Insulator	CNM8790
	14	Cushion	CNM9126
	15	Panel	See Contrast table(2)
	16	Tuner Amp Unit	See Contrast table(2)
	17	Screw	BMZ26P160FTC
	18	Screw	BPZ26P070FTC
	19	Screw	BSZ26P060FTC
	20	Antenna Cable(CN402)	CDH1336
	21	Clamper	CEF1048
	22	Pin Jack(CN301)	CKB1051
	23	Plug(CN991)	CKM1278
	24	Plug(CN871)	CKS-786
	25	Plug(CN302)	CKS1238
	26	Connector(CN701)	CKS3829
	27	Connector(CN661)	See Contrast table(2)
	28	Connector(CN801)	CKS4811
	29	Connector(CN992)	CKS4830
	30	Connector(CN101)	CKS5271
	31	Connector(CN271)	CKS5523
	32	Holder(CN401)	CNC5399
	33	Holder	See Contrast table(2)
	34	Heat Sink	CNR1894
	35	FM/AM Tuner Unit	CWE1952
	36	Holder	CND1054
	37	Plug(CN151)	KM200NA5L
	38	Holder	XNC7011
	39	Remote Control Unit	CXC5717
	40	Cover	CZN5357
	41	•••••	
	42	Drive Unit	CXC8072
	43	Screw	BMZ26P040FTC
	44	Screw(M2 x 2)	CBA1871
	45	Cord	CDE7392
	46	Gear	CNV7752
	47	Gear	CNV7753
	48	Gear	CNV7754
	49	Gear	CNV7755
	50	Switch Unit	CWS1389
	51	Switch	CSN1051
	52	Spring Switch	CSN1052
	53	Arm Unit	CXC2199
	54	Arm Unit	CXC6623
	55	Arm Unit	CXC6624
*	56	Chassis Unit	CXC8071
	57	Screw	JFZ20P020FTC
	58	Spring	XBL7003
	59	Holder	XNC7017
	60	Insulator	XNM7119
	61	Holder Unit	XXA7399
	62	Motor Unit(M3)	XXA7400
	63	Holder Unit	XXA7401
	64	Arm Unit	XXA7403
	65	Gear Unit	XXA7424
	66	•••••	
	67	Washer	YE15FTC
	68	CD Mechanism Module(S10.5)	CXK5763
	69	Screw	ISS26P055FTC
	70	Case	XNB7005
	71	Holder	XNC7014
	72	Insulator	XNM7114
	73	Panel Unit	See Contrast table(2)
	74	Connector	CKS5273
	75	Screw(M2 x 2)	CBA1871
	76	Screw	CBA1935
	77	Spring	CBH2530
	78	Arm	CNV6962
	79	Guide	CNV6967
	80	Guide	CNV8048
	81	Case Unit	CXC6483
	82	Screw(M2 x 3.5)	XBA7002
	83	Holder	XNC7019
	84	Flexible PCB	XNP7026
	85	Transistor(Q751,901)	2SD2396
	86	IC(IC911)	NJM2388F84
	87	IC(IC351)	PAL007C
	88	Holder	See Contrast table(2)
	89	Screw	See Contrast table(2)
	90	Cushion	CNN1405

(2) CONTRAST TABLE

DEH-P690UB/XN/UC , DEH-P6900UB/XN/UC and DEH-P7950UB/XN/ES are constructed the same except for the following:

Mark	No.	Description	DEH-P690UB/XN/UC	DEH-P6900UB/XN/UC	DEH-P7950UB/XN/ES
	15	Panel	CNS8914	CNS8915	CNS8915
	16	Tuner Amp Unit	CWN2152	CWN2152	CWN2154
	27	Connector(CN661)	CKS4124	CKS4124	Not used
	33	Holder	CND3782	CND3782	CND3783
	73	Panel Unit	XXA7408	XXA7407	XXA7407
	88	Holder	Not used	CNV7619	Not used
	89	Screw	Not used	BMZ40P140FTC	Not used

2.3 EXTERIOR(2)



(1) EXTERIOR(2) SECTION PARTS LIST

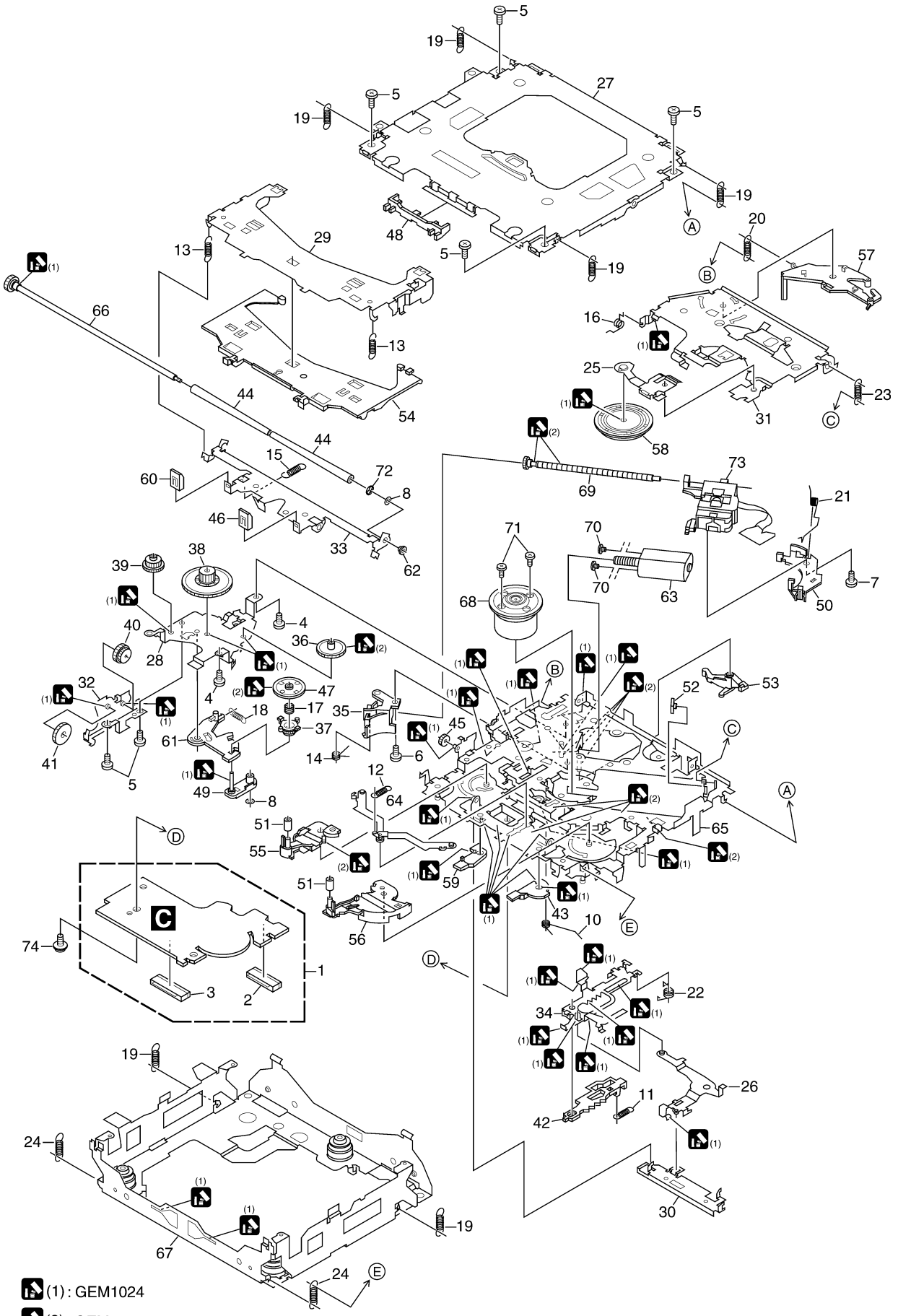
Mark	No.	Description	Part No.
	1	Detach Grille Assy	See Contrast table(2)
	2	Screw	BPZ20P080FTB
	3	Button	See Contrast table(2)
	4	Cover	CNS8491
	5	Connector(CN1961)	CKS5545
	6	Connector(CN1801)	CKS5662
	7	Holder	CND3781
	8	Double Sided Tape	CNM8673
	9	Holder	CNV9435
	10	OEL Unit	MXS8231
	11	Holder	CNV9676
	12	Button Unit(SRC/BAND)	CXC7257
	13	Button Unit(LIST)	CXC7264
	14	Knob Unit	CXC7271
	15	Spring	XBL7005
	16	Sub Grille Assy	See Contrast table(2)
	17	Plate	CNS8854
	18	Lighting Conductor	CNV9427
	19	Grille Unit	See Contrast table(2)
	20	•••••	
	21	IC(IC1931)	GP1UX31RK

(2) CONTRAST TABLE

DEH-P690UB/XN/UC , DEH-P6900UB/XN/UC and DEH-P7950UB/XN/ES are constructed the same except for the following:

Mark	No.	Description	DEH-P690UB/XN/UC	DEH-P6900UB/XN/UC	DEH-P7950UB/XN/ES
	1	Detach Grille Assy	CXC7125	CXC7126	CXC7127
	3	Button	CAI1120	CAI1142	CAI1142
	16	Sub Grille Assy	CXC7275	CXC7276	CXC7277
	19	Grille Unit	CXC7251	CXC7252	CXC7253

2.4 CD MECHANISM MODULE

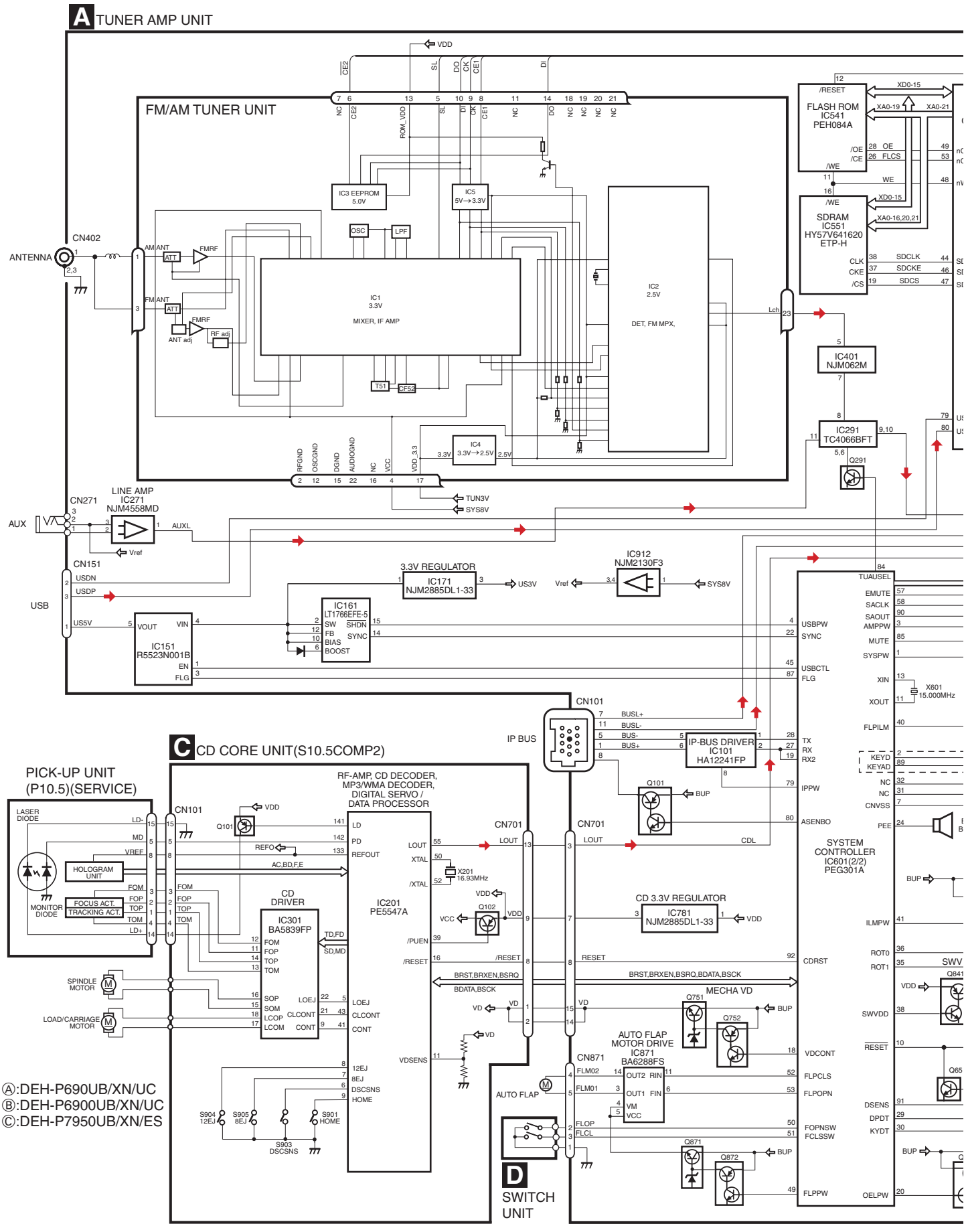


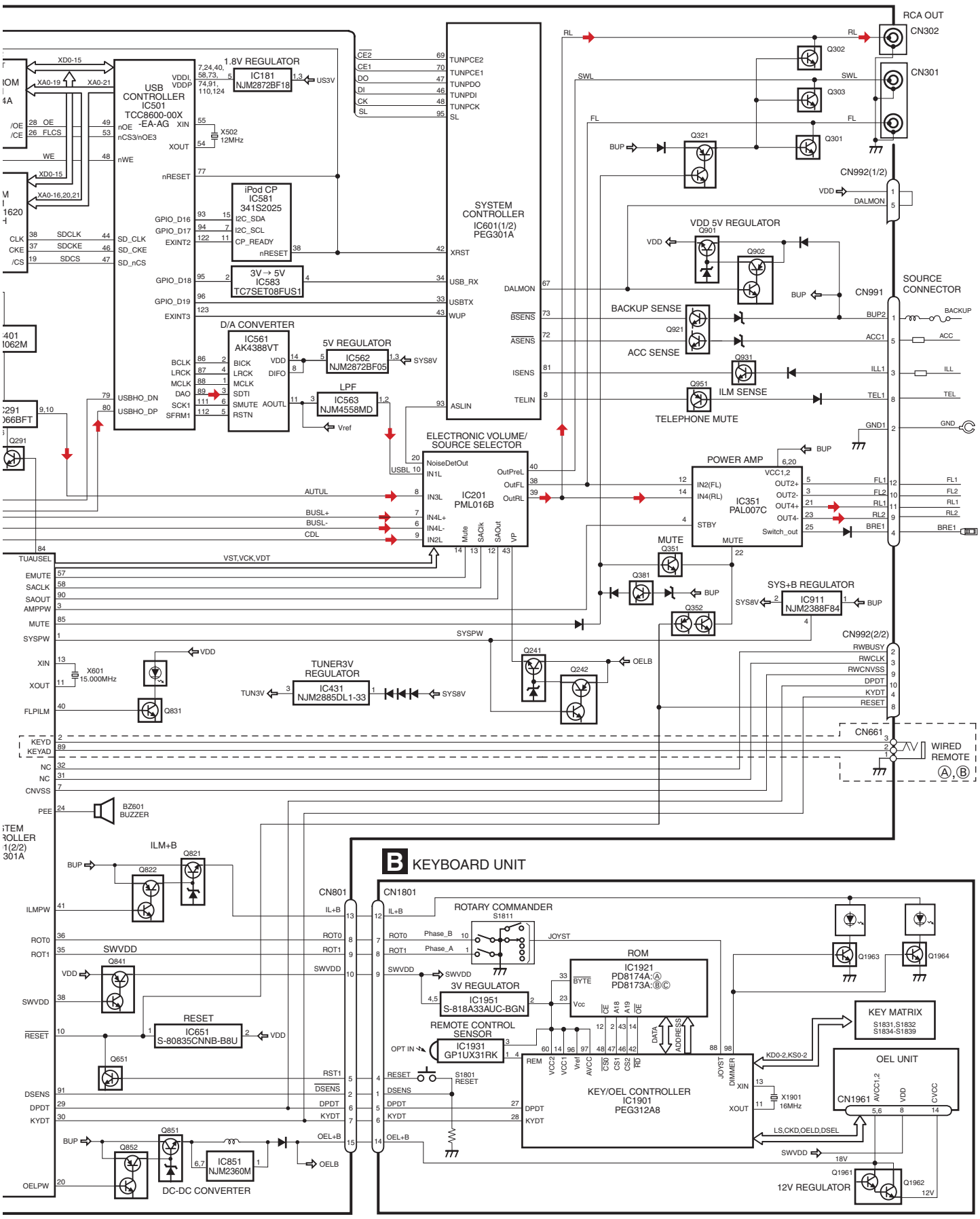
CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	CD Core Unit(S10.5COMP2)	CWX3514
	2	Connector(CN101)	CKS4182
	3	Connector(CN701)	CKS4808
	4	Screw	BMZ20P025FTC
	5	Screw	BSZ20P040FTC
	6	Screw(M2 x 3)	CBA1511
	7	Screw(M2 x 4)	CBA1835
	8	Washer	CBF1038
	9	•••••	
	10	Spring	CBH2609
	11	Spring	CBH2612
	12	Spring	CBH2614
	13	Spring	CBH2616
	14	Spring	CBH2617
	15	Spring	CBH2620
	16	Spring	CBH2855
	17	Spring	CBH2937
	18	Spring	CBH2735
	19	Spring	CBH2854
	20	Spring	CBH2642
	21	Spring	CBH2856
	22	Spring	CBH2857
	23	Spring	CBH2860
	24	Spring	CBH2861
	25	Spring	CBL1686
	26	Arm	CND1909
	27	Frame	CND2582
	28	Bracket	CND2583
	29	Arm	CND2584
	30	Lever	CND2585
	31	Arm	CND2586
	32	Bracket	CND2587
	33	Arm	CND2588
	34	Lever	CND2589
	35	Holder	CNV7201
	36	Gear	CNV7207
	37	Gear	CNV7208
	38	Gear	CNV7209
	39	Gear	CNV7210
	40	Gear	CNV7211
	41	Gear	CNV7212
	42	Rack	CNV7214
	43	Arm	CNV7216
	44	Roller	CNV7218
	45	Gear	CNV7219
	46	Guide	CNV7361
	47	Gear	CNV7595
	48	Guide	CNV7799
	49	Arm	CNV7805
	50	Rack	CNV8342
	51	Roller	CNV8343
	52	Holder	CNV8344
	53	Arm	CNV8345
	54	Guide	CNV8347
	55	Arm	CNV8348
	56	Arm	CNV8349
	57	Arm	CNV8350
	58	Clamper	CNV8365
	59	Arm	CNV8386
	60	Guide	CNV8396
	61	Arm	CNV8413
	62	Collar	CNV8938
	63	Motor Unit(M2)	CXC4026
	64	Arm Unit	CXC4027
	65	Chassis Unit	CXC4028
	66	Gear Unit	CXC4029
	67	Frame Unit	CXC4031
	68	Motor Unit(M1)	CXC7134
	69	Screw Unit	CXC6359
	70	Screw	JFZ20P020FTC
	71	Screw	JGZ17P022FTC
	72	Washer	YE20FTC
	73	Pickup Unit(P10.5)(Service)	CXX1942
	74	Screw	IMS26P030FTC

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

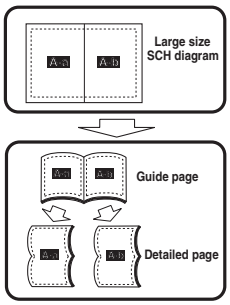
3.1 BLOCK DIAGRAM

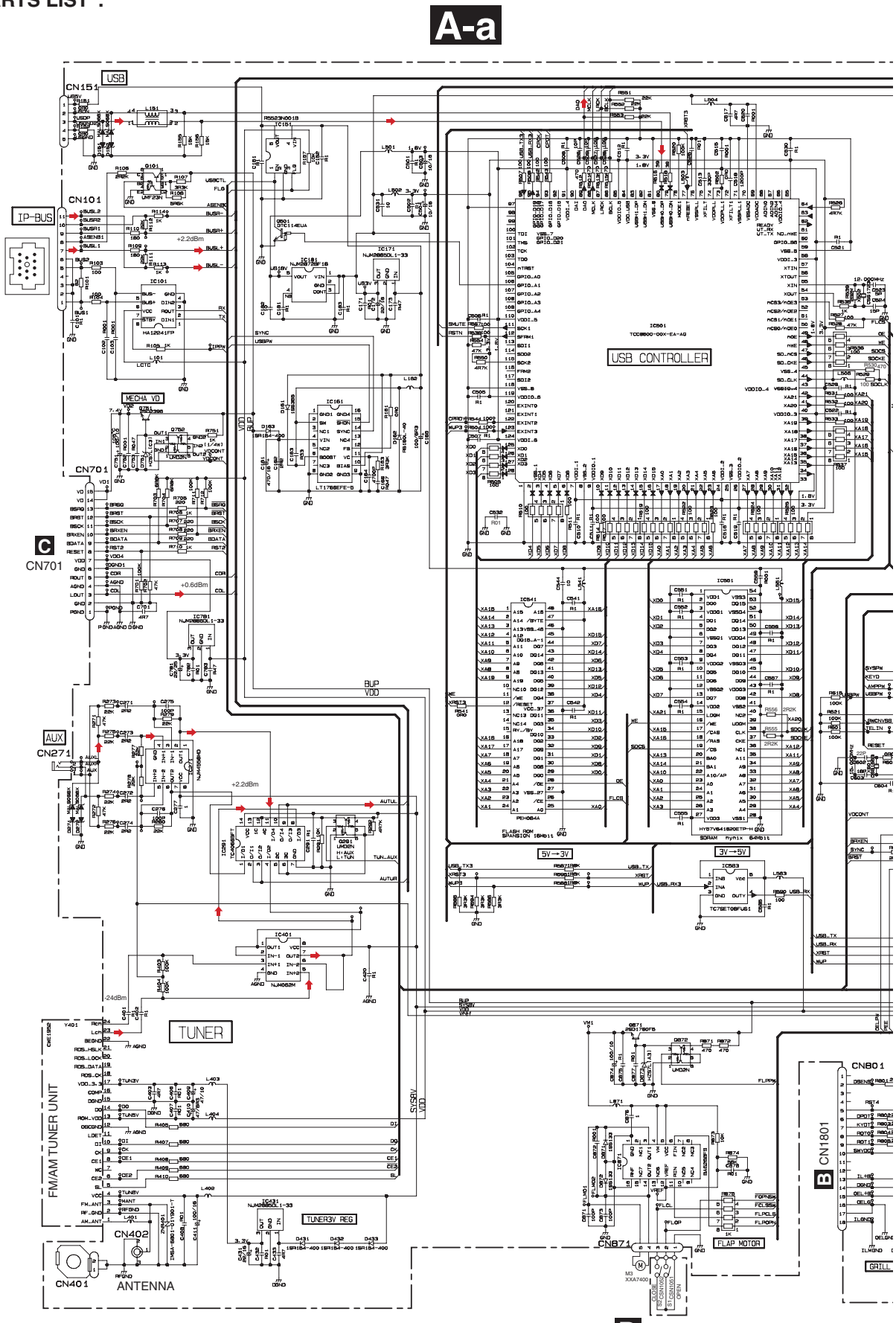



USB CONTROLLER IC501 TCC8600-00X -EA-AG
1.8V REGULATOR
IC181 NJM2872BF18
X502 12MHz
iPod CP IC581 341S2025
3V→5V IC583 TC7SET08FUS1
D/A CONVERTER IC561 AK4388VT
5V REGULATOR IC562 NJM2872BF05
LPF IC563 NJM4558MD
SYSTEM CONTROLLER IC601(1/2) PEG301A
ELECTRONIC VOLUME/ SOURCE SELECTOR IC201 PML016B
RCA OUT
CN302
CN301
VDD 5V REGULATOR
BACKUP SENSE
ACC SENSE
ILM SENSE
TELEPHONE MUTE
SOURCE CONNECTOR
CN991
POWER AMP IC351 PAL007C
MUTE
SYS+B REGULATOR IC911 NJM2388F84
CN992(1/2)
CN992(2/2)
TUNER3V REGULATOR IC431 NJM2885DL1-33
X601 15.000MHz
BZ601 BUZZER
CN661
WIRED REMOTE
ILM+B
SWVDD
RESET IC651 S-80835CNNB-B8U
DC-DC CONVERTER IC851 NJM2360M
B KEYBOARD UNIT
CN801
CN1801
ROTARY COMMANDER S1811
3V REGULATOR IC1951 S-818A33AUC-BGN
REMOTE CONTROL SENSOR IC1931 GP1UX31RK
ROM IC1921 PD8174A:Ⓐ PD8173A:ⒷⒸ
KEY/OEL CONTROLLER IC1901 PEG312A8
KEY MATRIX S1831,S1832 S1834-S1839
OEL UNIT CN1961
X1901 16MHz
12V REGULATOR
DEH-P690UB/XN/UC
17

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to " EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

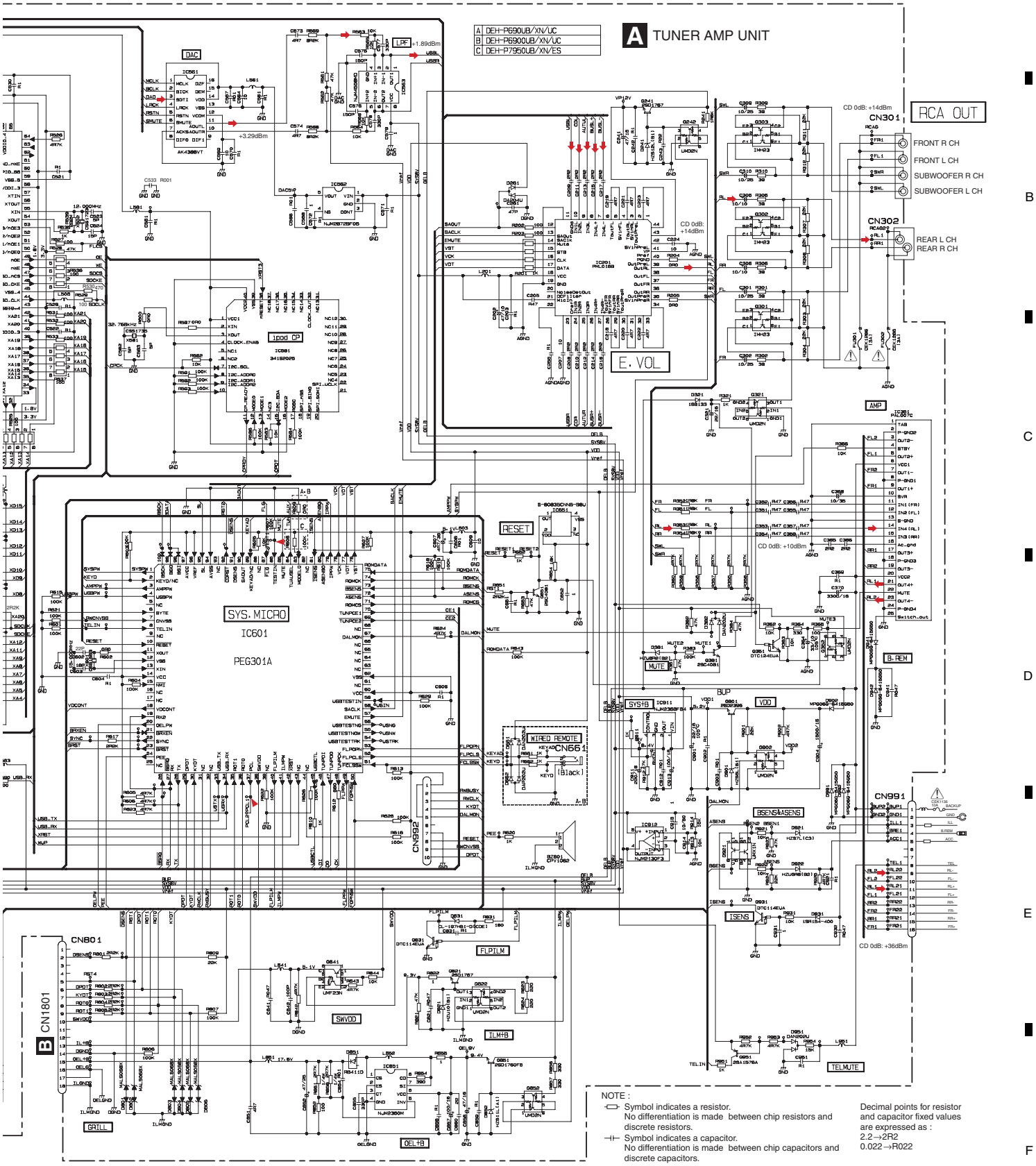




A-b

A	DEH-P690UB/XN/UC
B	DEH-P6900UB/XN/UC
C	DEH-P7950UB/XN/ES

A TUNER AMP UNIT



NOTE :

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

A	DEH-P690UB/XN/UC
B	DEH-P6900UB/XN/UC
C	DEH-P7950UB/XN/ES

A TUNER AMP UNIT

DEH-P690UB/XN/UC

DAC

IC551 AK4388VT

LPF +1.89dBm

+3.29dBm

IC552 NJM2872BF05

IC201 PML016B

E. VOL

CD 0dB: +14dBm

CD 0dB: +10dBm

RCA OUT

CN301

FRONT R CH

FRONT L CH

SUBWOOFER R CH

SUBWOOFER L CH

CN302

REAR L CH

REAR R CH

AMP

IC351 PAL007C

IPOD CP

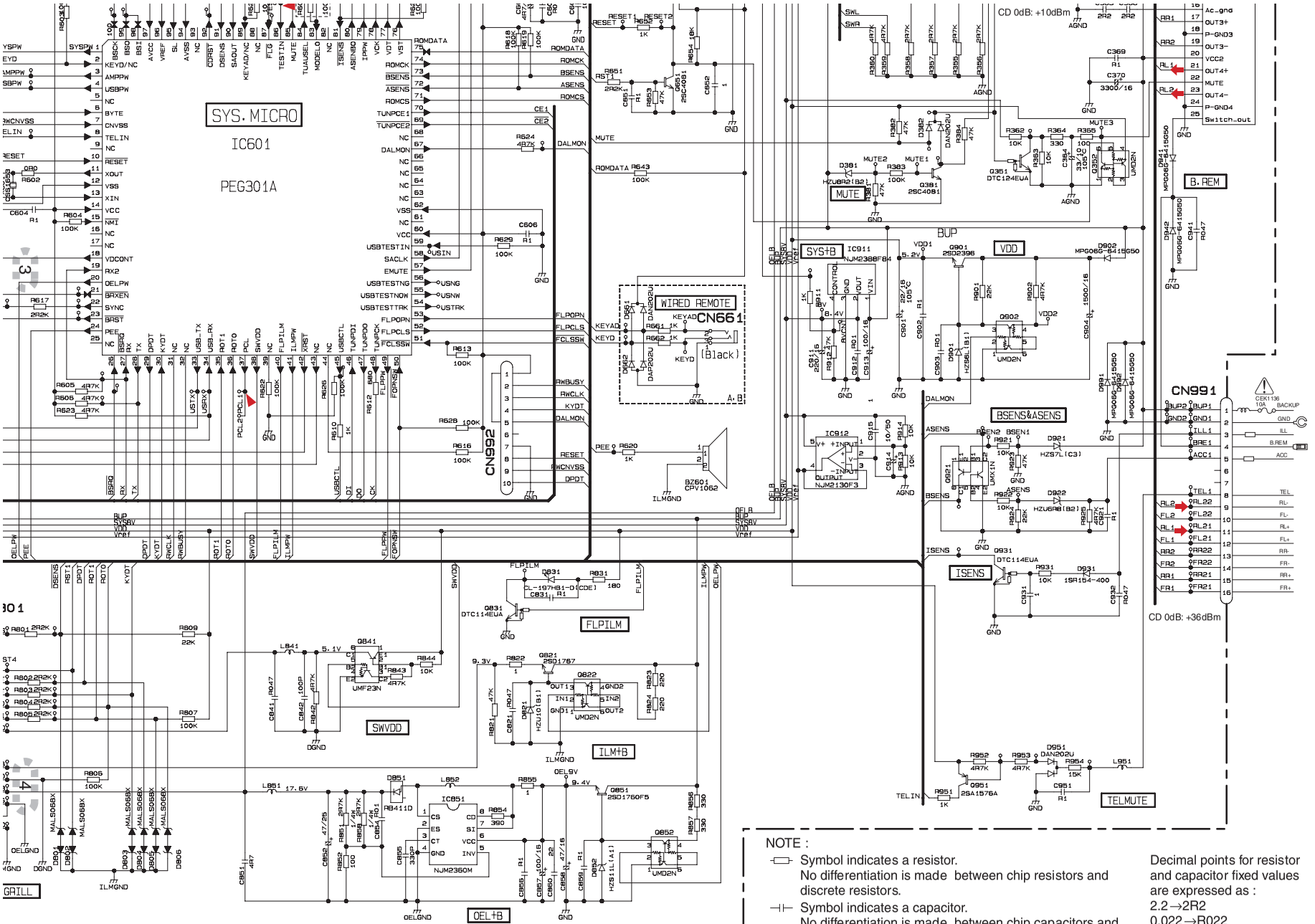
IC581 34152025

32.768kHz

RESET

IC651 S-80835CNNB-B8U

SYS. MICRO



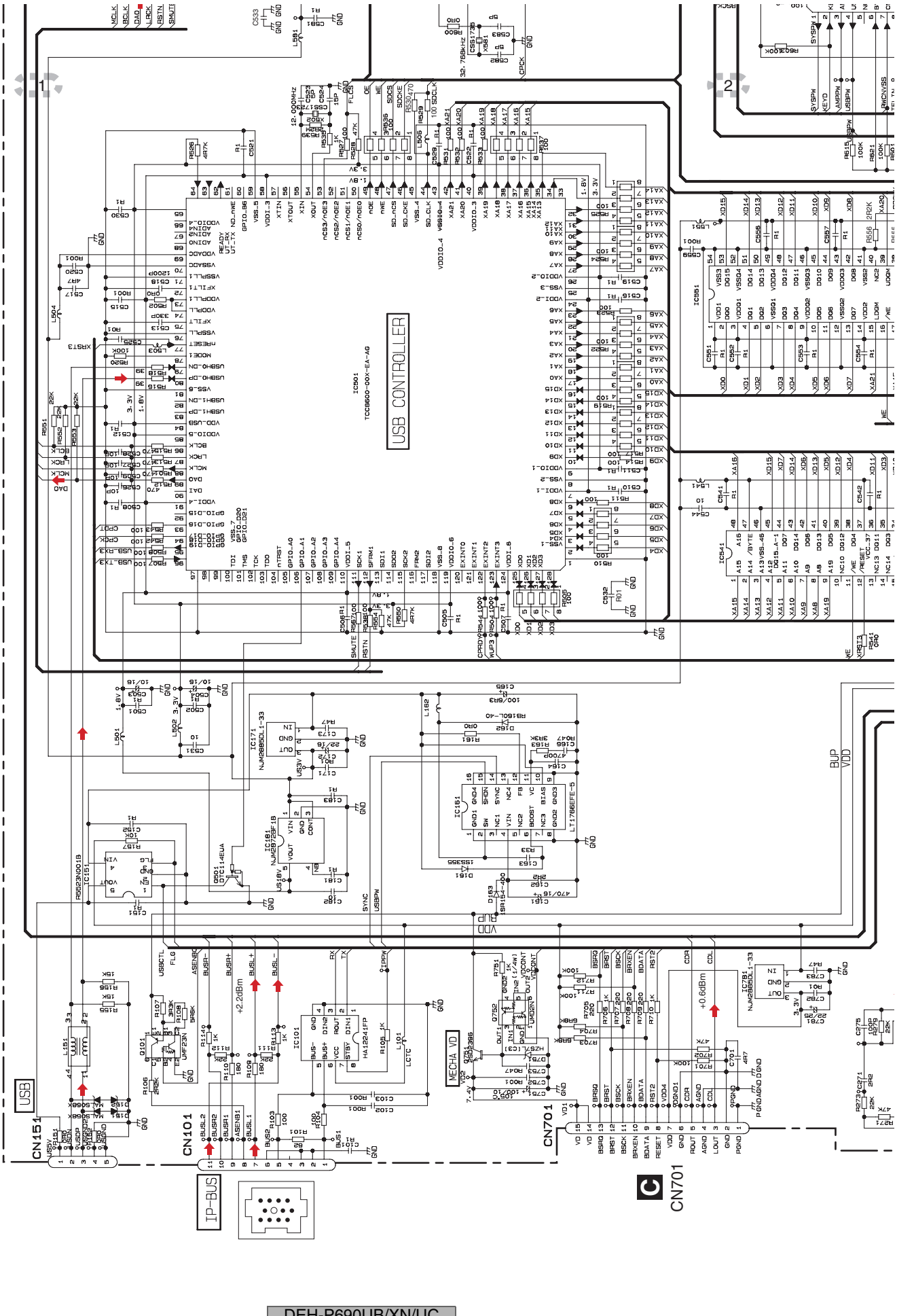
NOTE :

- ⊣⊢ Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- ⊣⊢ Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

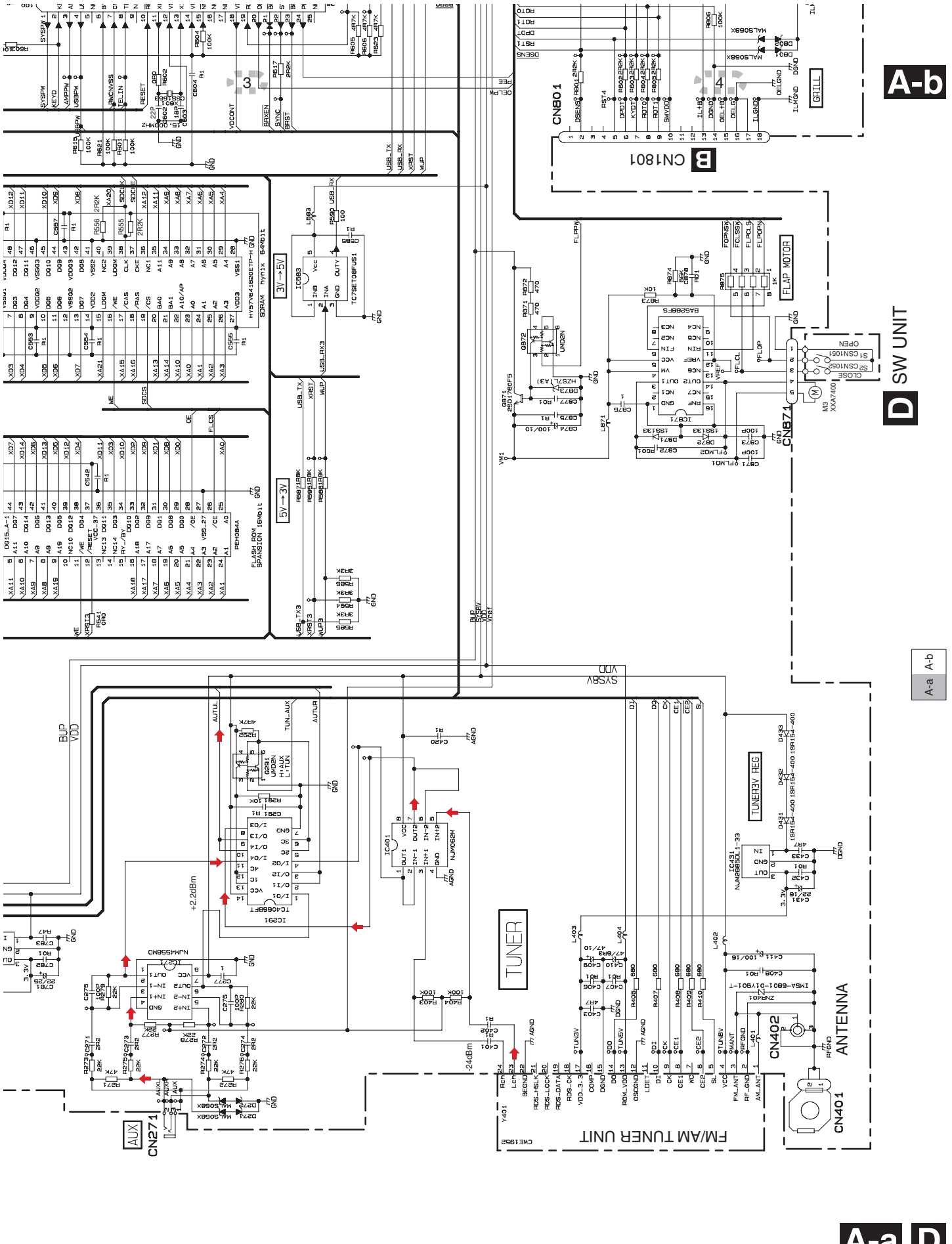
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022

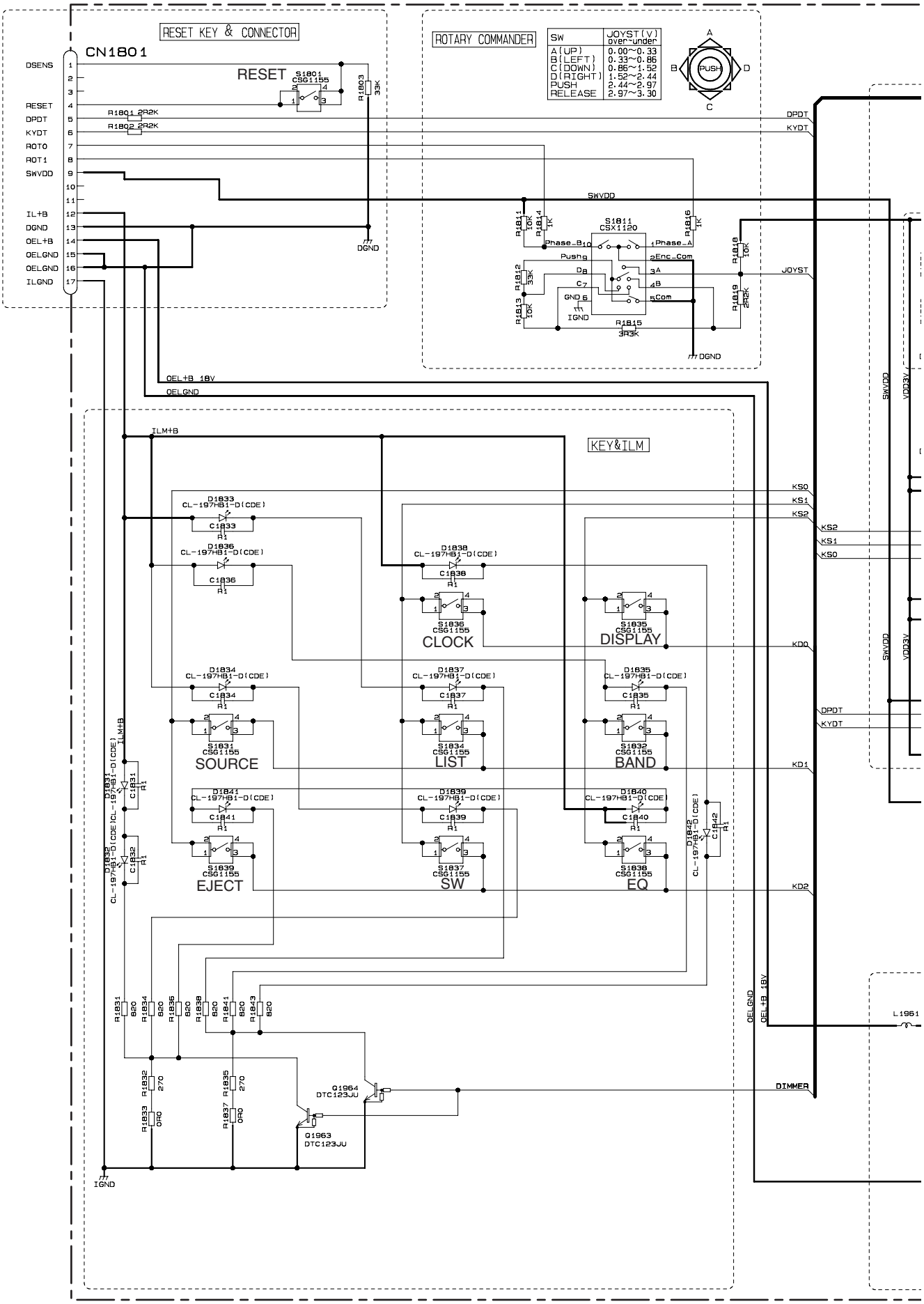
A-a A-b

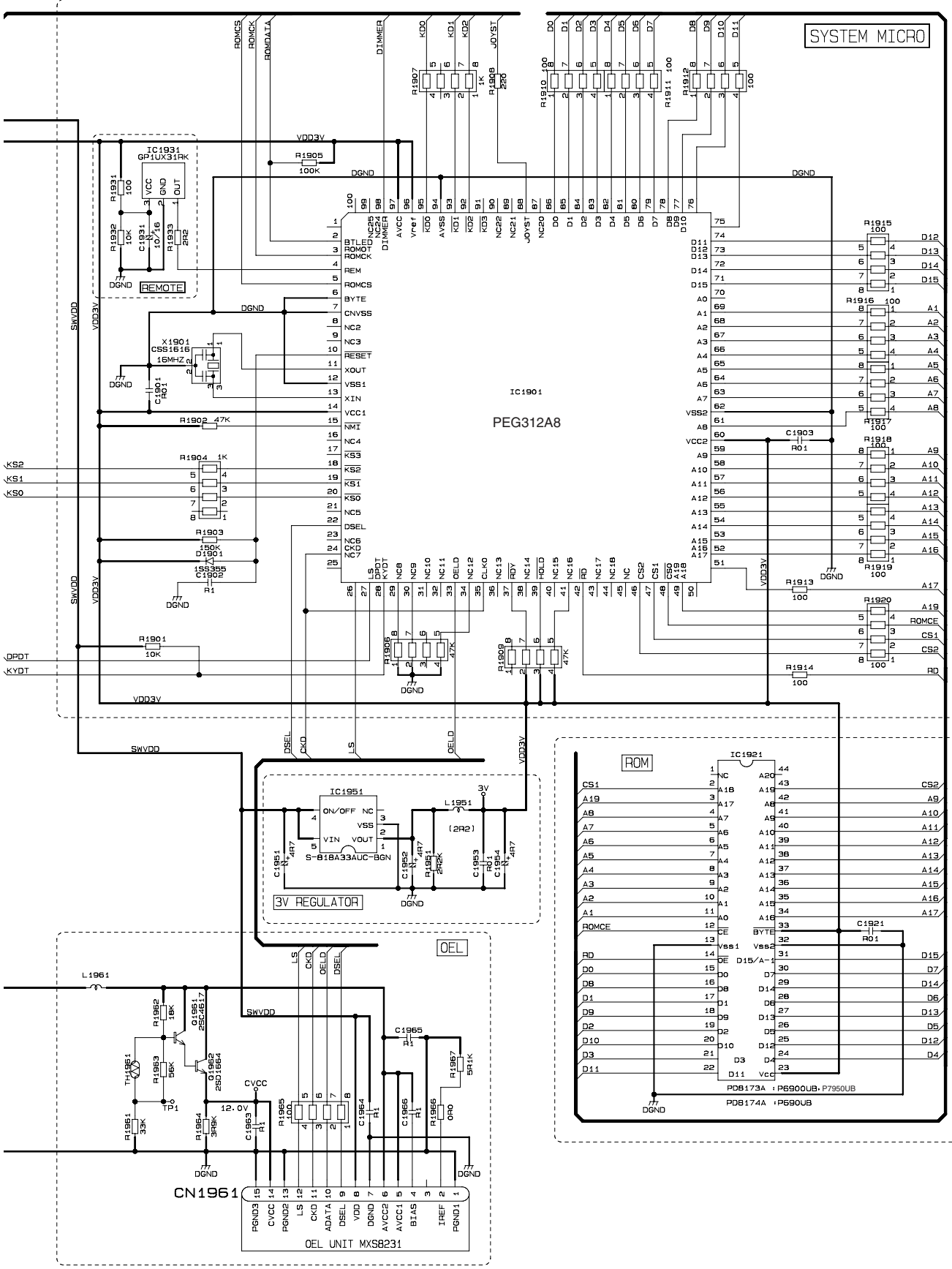

USB CONTROLLER
IC501
TCC8600-004-EA-AG
CN151
USB
CN101
IP-BUS
CN701
MECHA VD
BUP
VDD

A-a


A-b
B CN1801
D SW UNIT
A-a D
TUNER
FM/AM TUNER UNIT
ANTENNA
CN401
CN402
CN271
AUX
FLAP MOTOR
CN874
GRILL
CN801
TUNER3V REG
3V→5V
5V→3V
FLASH ROM SPANSION
SDRAM hynix
BUP VDD
SYS8V
VDD
A-b
A-a

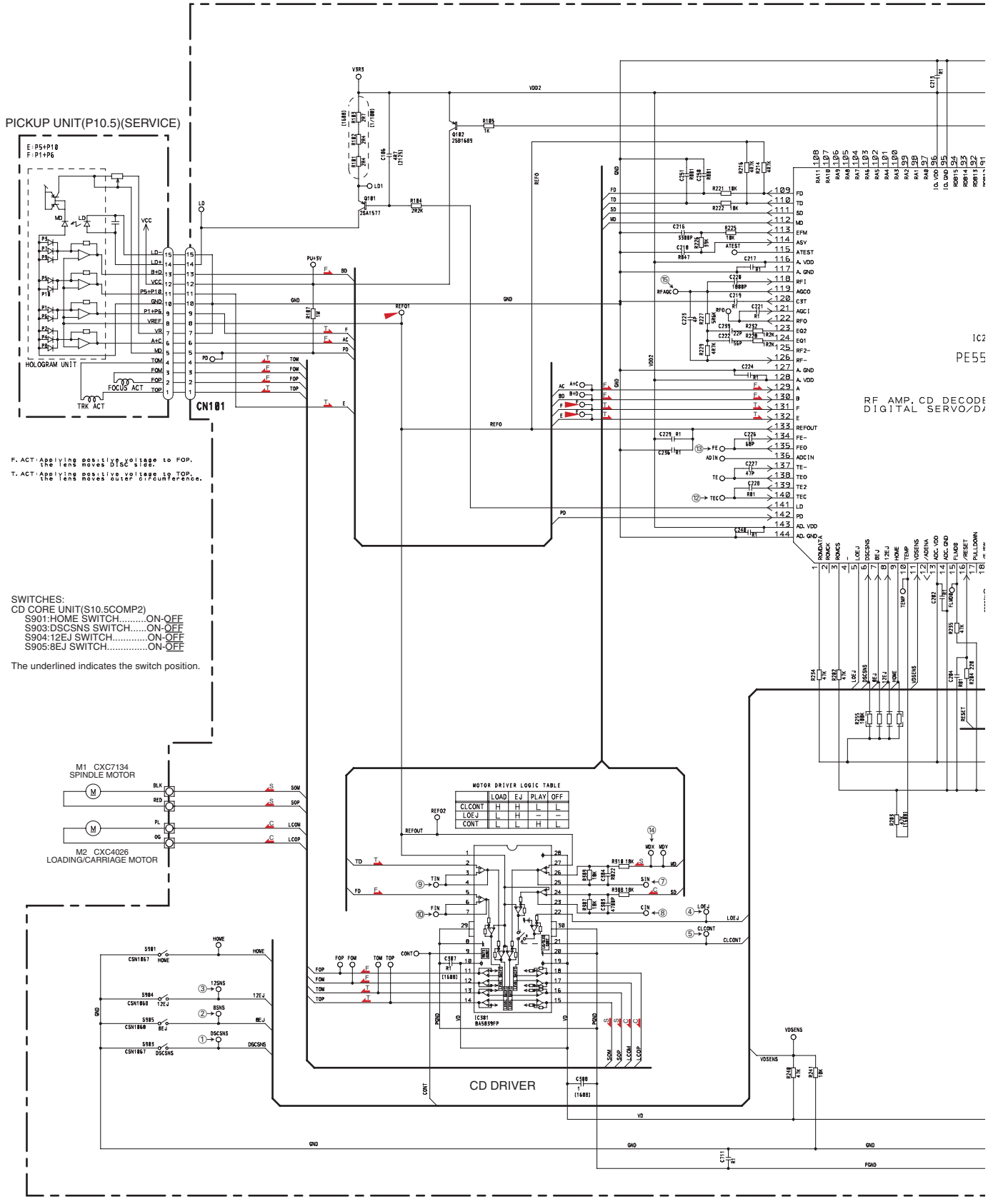
3.3 KEYBOARD UNIT




SYSTEM MICRO
IC1901
PEG312A8
REMOTE
IC1931
GP1UX31RK
X1901
CSS1616
16MHZ
3V REGULATOR
IC1951
S-818A33AUC-BGN
OEL
CN1961
OEL UNIT MXS8231
ROM
IC1921
PD8173A : P6900UB, P7950UB
PD8174A : P6900UB
DGND
VDD3V
SWVDD
CVCC
12.0V
3V

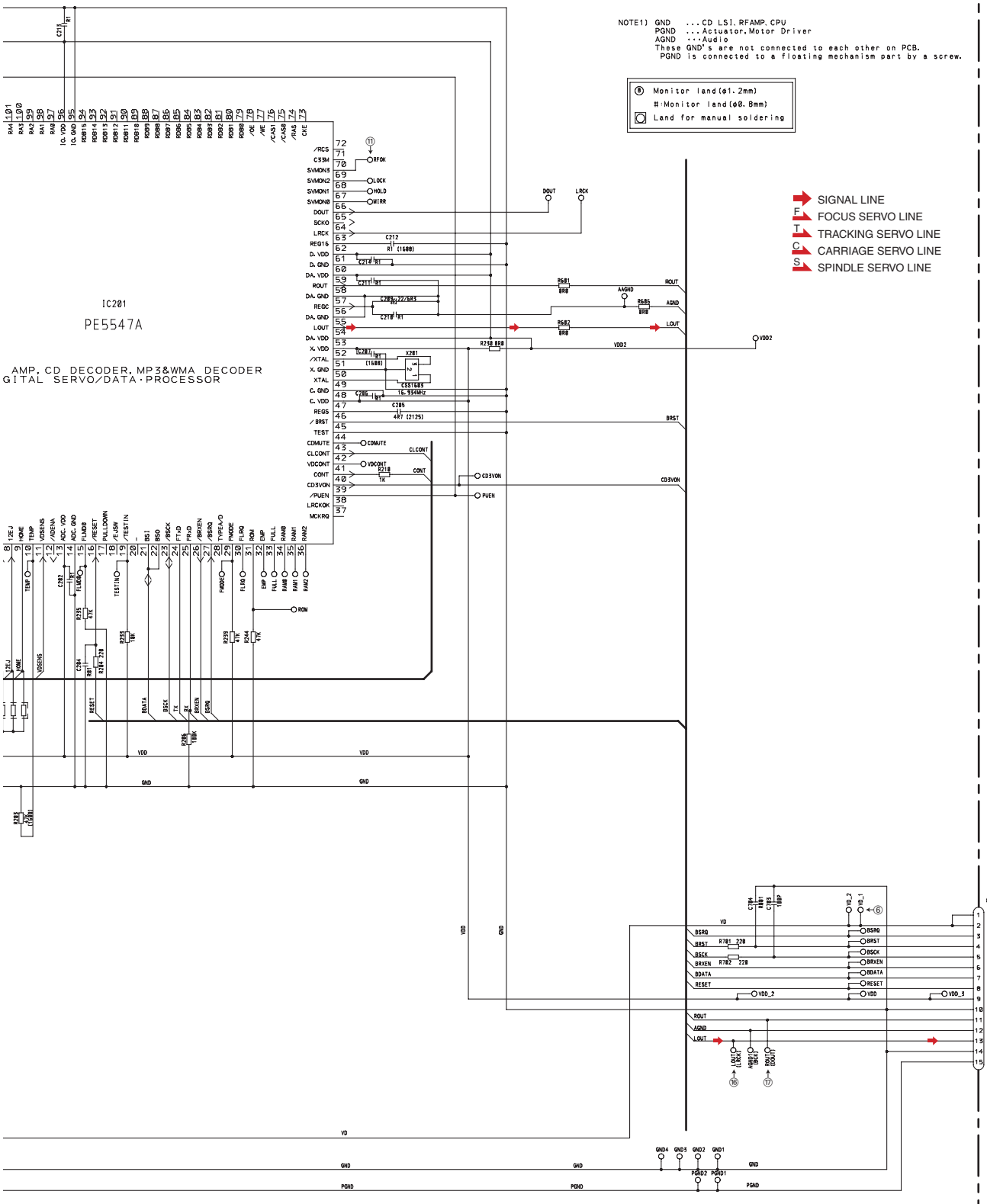
3.4 CD MECHANISM MODULE(GUIDE PAGE)

C-a



C

C CD CORE UNIT(S10.5COMP2)



C CD CORE UNIT(S10.5COMP2)

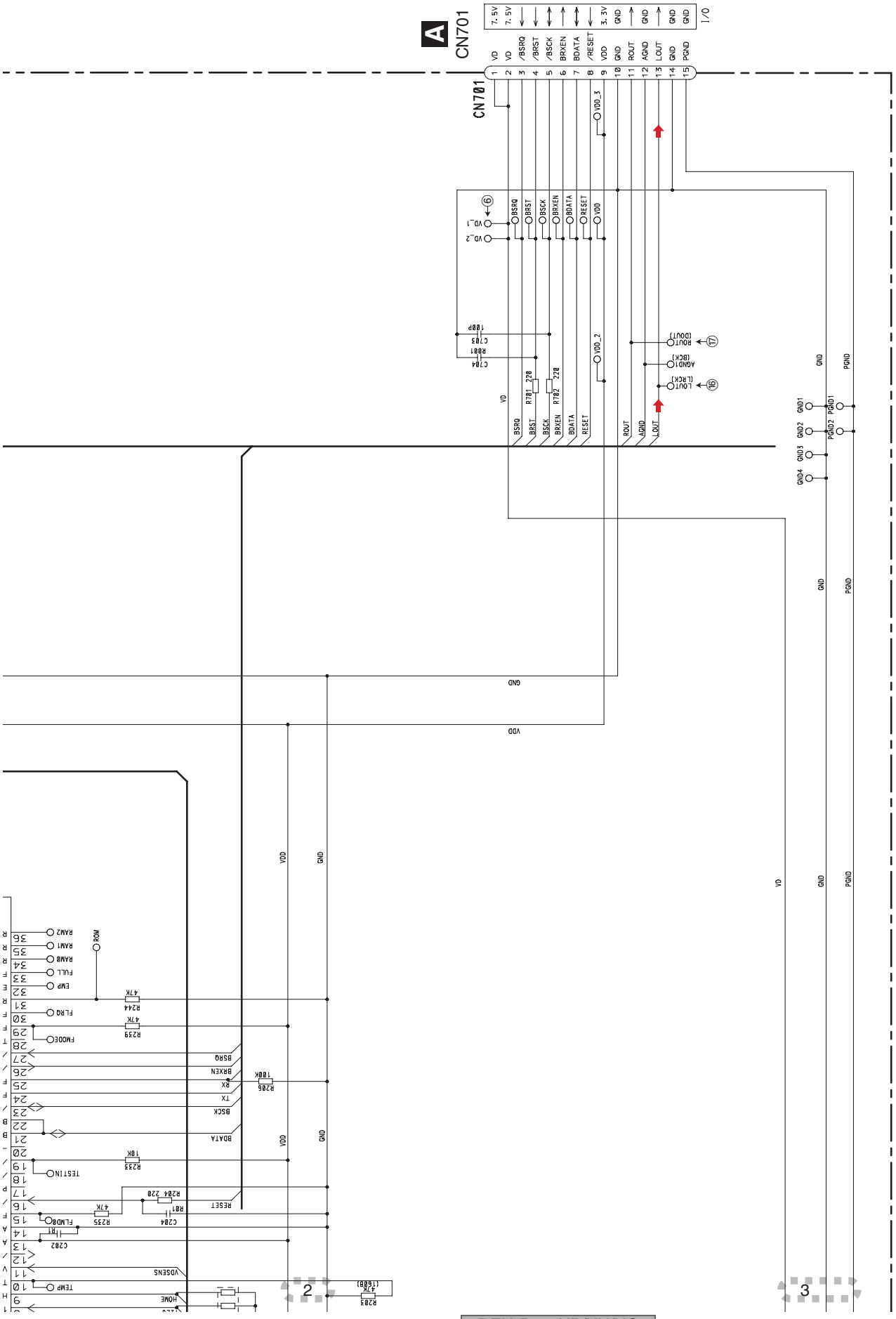
NOTE1) GND ...CD LSI, RFAMP, CPU
PGND ...Actuator, Motor Driver
AGND ...Audio
These GND's are not connected to each other on PCB.
PGND is connected to a floating mechanism part by a screw.

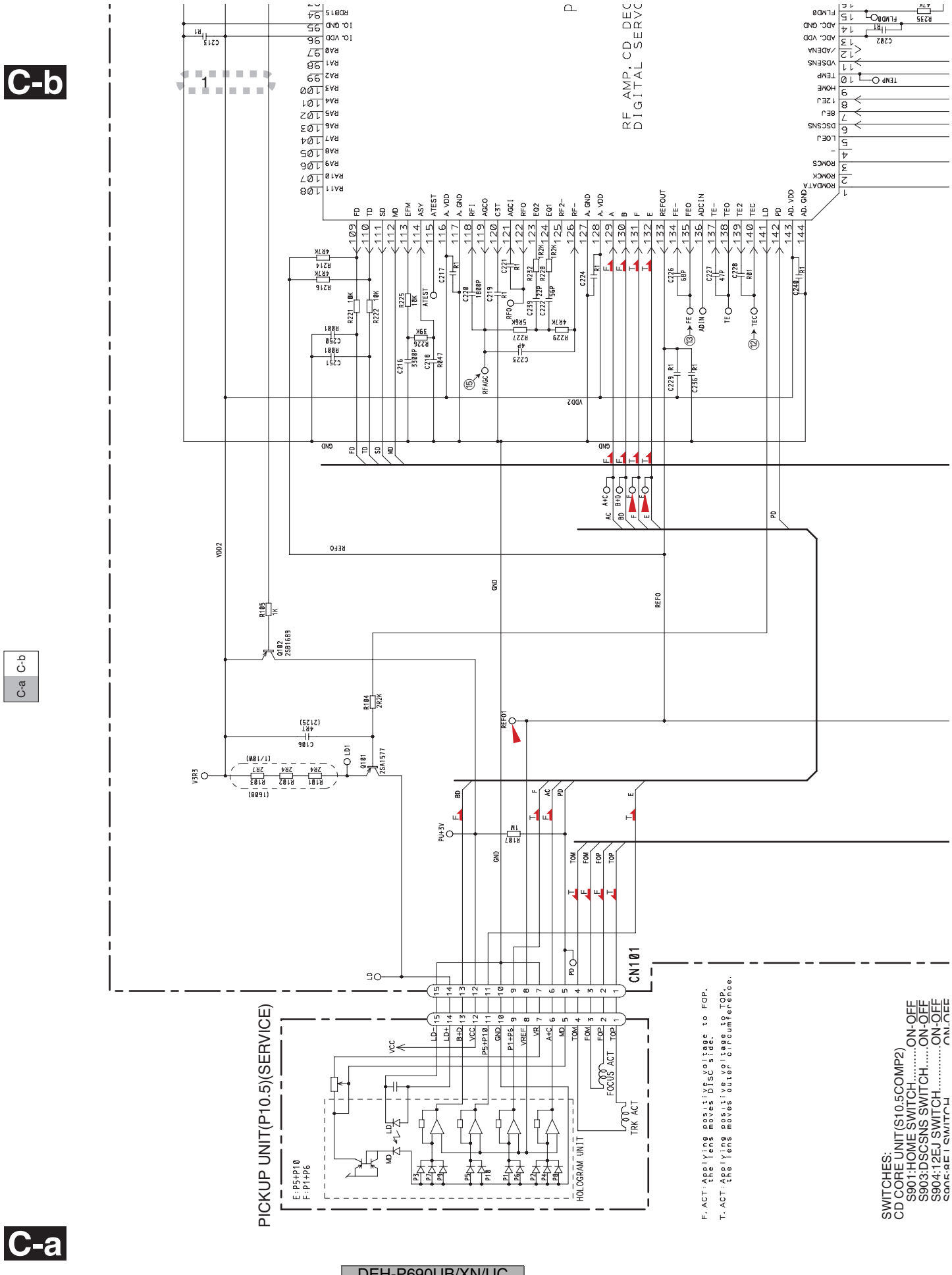
Ⓑ Monitor land(φ1.2mm)
#:Monitor land(φ0.8mm)
Land for manual soldering

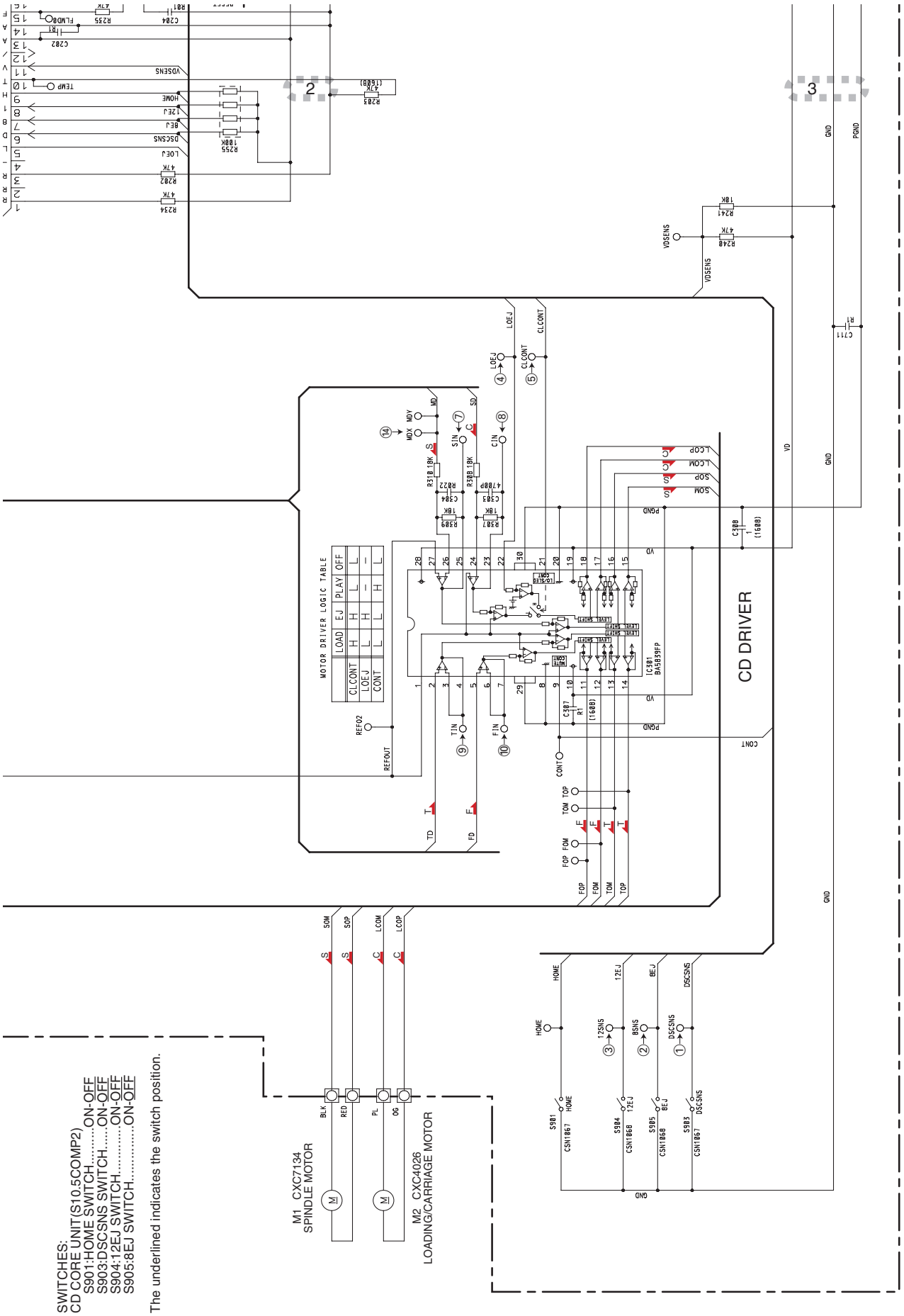
SIGNAL LINE
F FOCUS SERVO LINE
T TRACKING SERVO LINE
C CARRIAGE SERVO LINE
S SPINDLE SERVO LINE

IC201
PE5547A

AMP, CD DECODER, MP3&WMA DECODER
ITAL SERVO/DATA·PROCESSOR


A
CN701
CN701
7.5V
7.5V
3.3V
I/O
VD
VD
/BSRQ
/BRST
/BSCK
BRXEN
BDATA
/RESET
VDD
GND
ROUT
AGND
LOUT
GND
PGND
VDD_3
VDD_2
VD_1
VD_2
BSRQ
BRST
BSCK
BRXEN
BDATA
RESET
VDD
ROUT
(DOUT)
AGND1
(BCK)
LOUT
(LRCK)
R701 220
R702 220
C703 100P
C704 100P
R801
GND1
GND2
GND3
GND4
PGND1
PGND2
GND
PGND
VD
VDD
ROM
RAM2
RAM1
RAM0
FULL
EMP
FLRQ
FMODE
BSRQ
BRXEN
RX
TX
BSCK
BDATA
TESTIN
RESET
FLWDB
TEMP
HOME
VDSENS
R244 47K
R239 47K
R236 100K
R233 10K
R204 220
R235 47K
C284
C282
R203 47K (16DB)
2
3
C-a C-b
C-b
DEH-P690UB/XN/UC
29


C-b
C-a
RF AMP, CD DEC
DIGITAL SERVO
PICKUP UNIT(P10.5)(SERVICE)
E: P5+P10
F: P1+P6
HOLOGRAM UNIT
CN101
SWITCHES:
CD CORE UNIT(S10.5COMP2)
S901:HOME SWITCH.....ON-OFF
S903:DSCSNS SWITCH.....ON-OFF
S904:12EJ SWITCH.....ON-OFF
F. ACT : Applying positive voltage to FOP.
the lens moves Disc side.
T. ACT : Applying positive voltage to TOP.
the lens moves outer circumference.

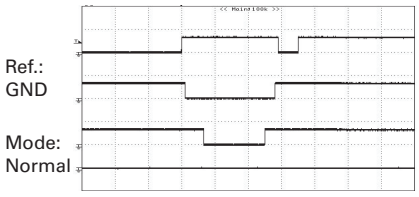

C-b
C-a c-b
C-a
CD DRIVER
IC301 BA5859FP
MOTOR DRIVER LOGIC TABLE
LOAD EJ PLAY OFF
CLCONT H H L L
LOEJ L H – –
CONT L L H L
SWITCHES:
CD CORE UNIT(S10.5COMP2)
S901:HOME SWITCH.....ON-OFF
S903:DSCSNS SWITCH.....ON-OFF
S904:12EJ SWITCH.....ON-OFF
S905:8EJ SWITCH.....ON-OFF
The underlined indicates the switch position.
M1 CXC7134
SPINDLE MOTOR
M2 CXC4026
LOADING/CARRIAGE MOTOR
VDSENS
LOEJ
CLCONT
CONT
REFO2
REFOUT
TIN
FIN
TD
FD
FOP
FOM
TOM
TOP
HOME
12SNS
8SNS
DSCSNS
GND
PGND
VD

● Waveforms

Note : 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage REFO1(1.65 V)

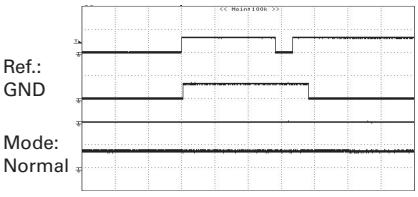
①DSCSNS	5 V/div	500 ms/div
②8SNS	5 V/div	
③12SNS	5 V/div	
④LOEJ	5 V/div	

12 cm CD Loading operation



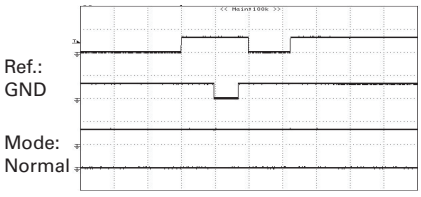
①DSCSNS	5 V/div	500 ms/div
⑤CLCONT	5 V/div	
④LOEJ	5 V/div	
⑥VD	10 V/div	

12 cm CD Loading operation



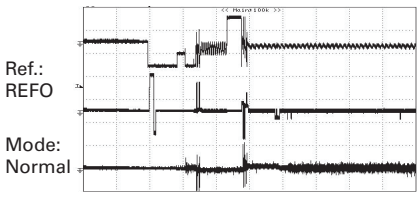
①DSCSNS	5 V/div	500 ms/div
②8SNS	5 V/div	
③12SNS	5 V/div	
④LOEJ	5 V/div	

8 cm CD Loading operation



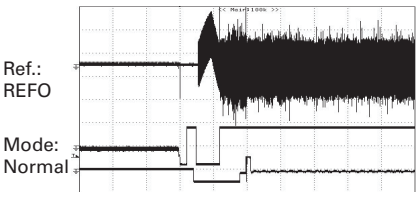
⑦SIN	1 V/div	1 s/div
⑧CIN	500 mV/div	
⑨TIN	1 V/div	

12 cm CD-DA setup operation after loading



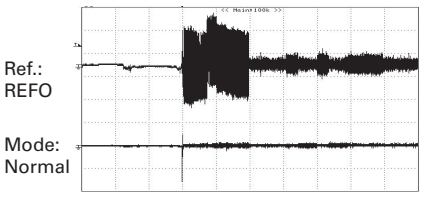
⑩FIN	200 mV/div	500 ms/div
⑪RFOK(MONI_2)	2 V/div	
⑦SIN	2 V/div	

12 cm CD-DA Source On setup operation



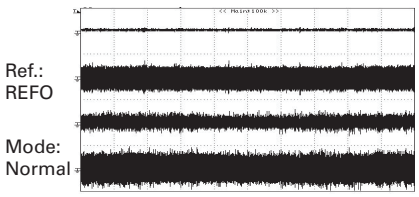
⑫TE	500 mV/div	200 ms/div
⑬FE	500 mV/div	

Source On setup operation



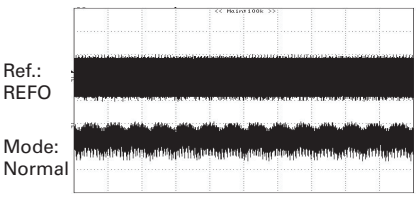
⑬FE	500 mV/div	20 ms/div
⑩FIN	500 mV/div	
⑫TE	500 mV/div	
⑨TIN	500 mV/div	

CD-DA Play operation



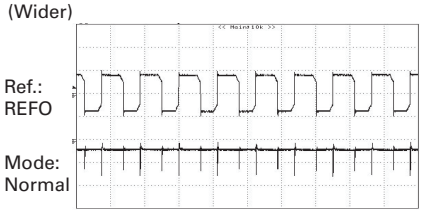
⑭MDX	2 V/div	200 ms/div
⑦SIN	500 mV/div	

Spindle waveform during play operation



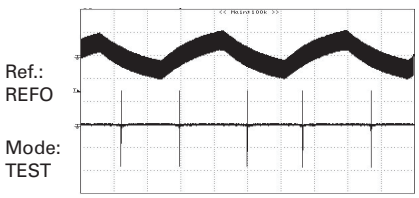
⑭MDX	2 V/div	5 µs/div
⑦SIN	500 mV/div	

Spindle waveform during play operation (Wider)



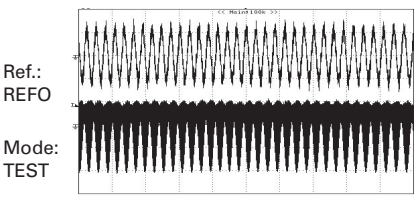
⑩FIN	500 mV/div	200 ms/div
⑬FE	500 mV/div	

Focus Search waveform



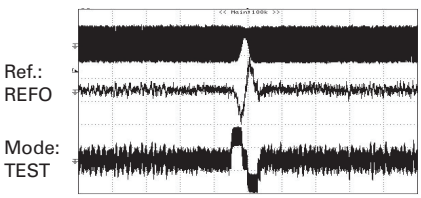
⑫TE	500 mV/div	2 ms/div
⑮RFAGC	500 mV/div	

Track Open waveform



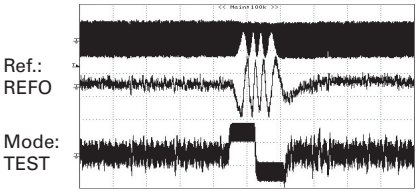
⑮RFAGC	1 V/div	500 µs/div
⑫TE	500 mV/div	
⑨TIN	500 mV/div	

1 Track Jump waveform



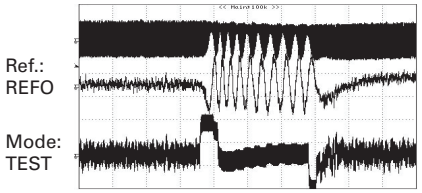
⑮RFAGC	1 V/div	500 µs/div
⑫TE	500 mV/div	
⑨TIN	500 mV/div	

4 Tracks Jump waveform



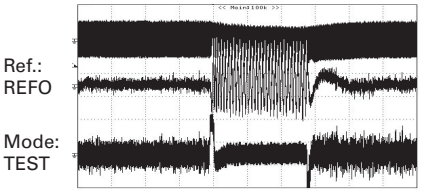
⑮RFAGC	1 V/div	500 µs/div
⑫TE	500 mV/div	
⑨TIN	500 mV/div	

10 Tracks Jump waveform



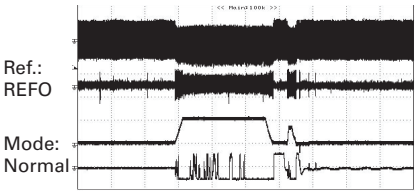
⑮RFAGC	1 V/div	2 ms/div
⑫TE	500 mV/div	
⑨TIN	500 mV/div	

32 Tracks Jump waveform



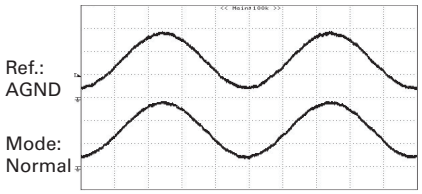
⑮RFAGC	1 V/div	200 ms/div
⑫TE	1 V/div	
⑧CIN	1 V/div	
⑦SIN	2 V/div	

Search operation(Outter to Inner)



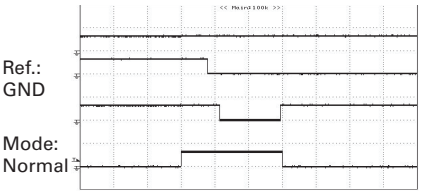
⑯LOUT	1 V/div	200 µs/div
⑰ROUT	1 V/div	

Analog audio waveform



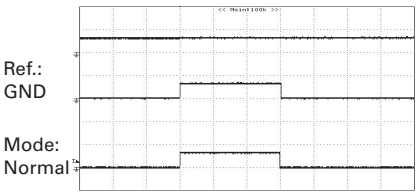
①DSCSNS	5 V/div	500 ms/div
②8SNS	5 V/div	
③12SNS	5 V/div	
④LOEJ	5 V/div	

12 cm CD Eject operation



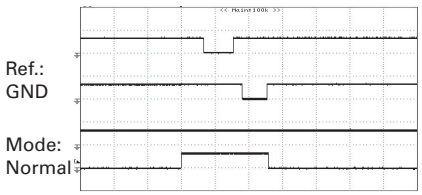
①DSCSNS	5 V/div	500 ms/div
⑤CLCONT	5 V/div	
④LOEJ	5 V/div	

12 cm CD Eject operation



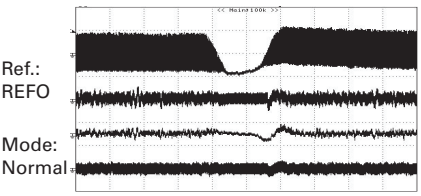
①DSCSNS	5 V/div	500 ms/div
②8SNS	5 V/div	
③12SNS	5 V/div	
④LOEJ	5 V/div	

8 cm CD Eject operation



⑮RFAGC	1 V/div	500 µs/div
⑨TIN	1 V/div	
⑫TE	1 V/div	
⑩FIN	1 V/div	

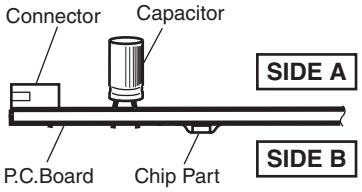
Black dot(800 µm) during play



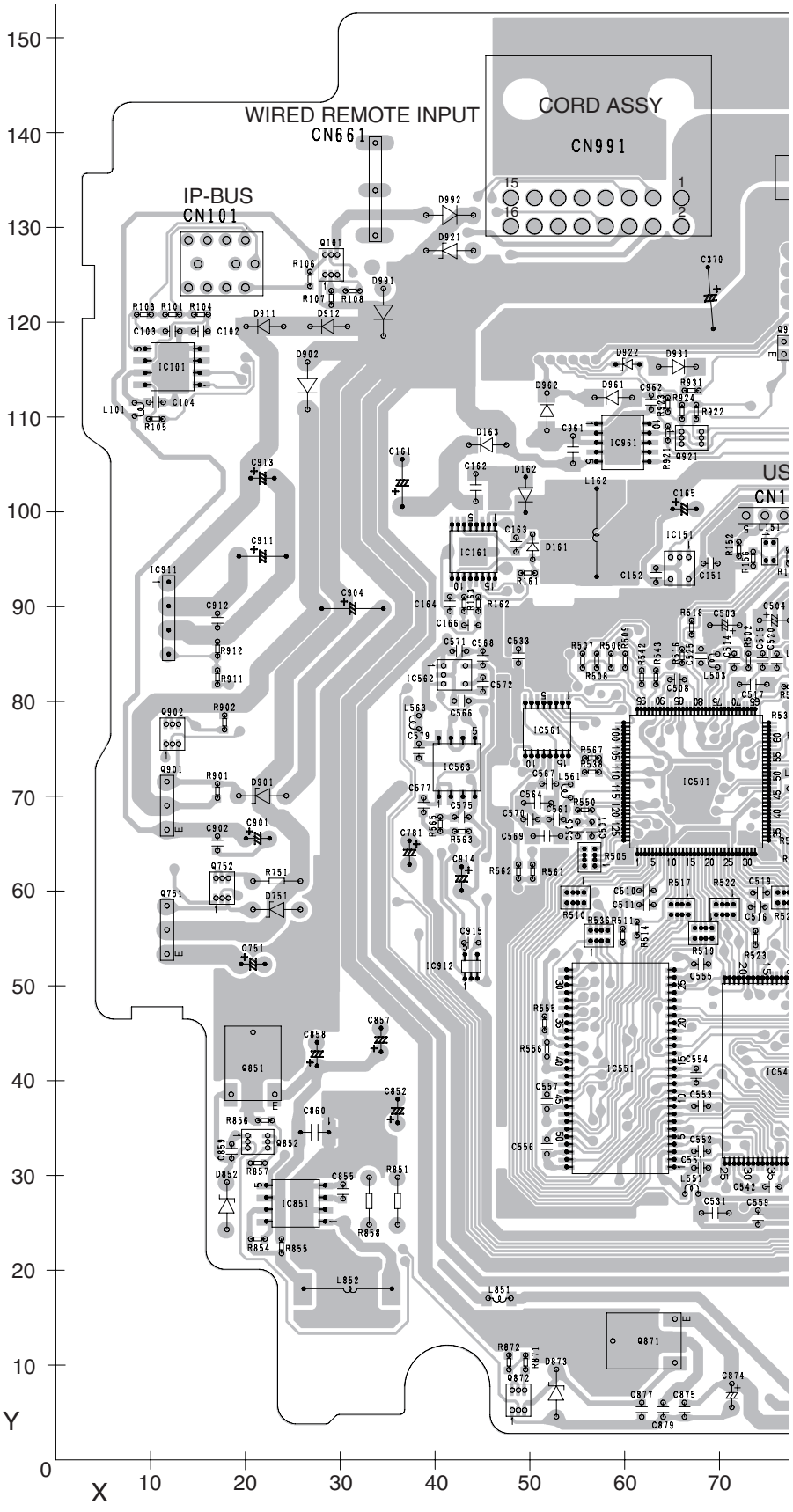
4. PCB CONNECTION DIAGRAM
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

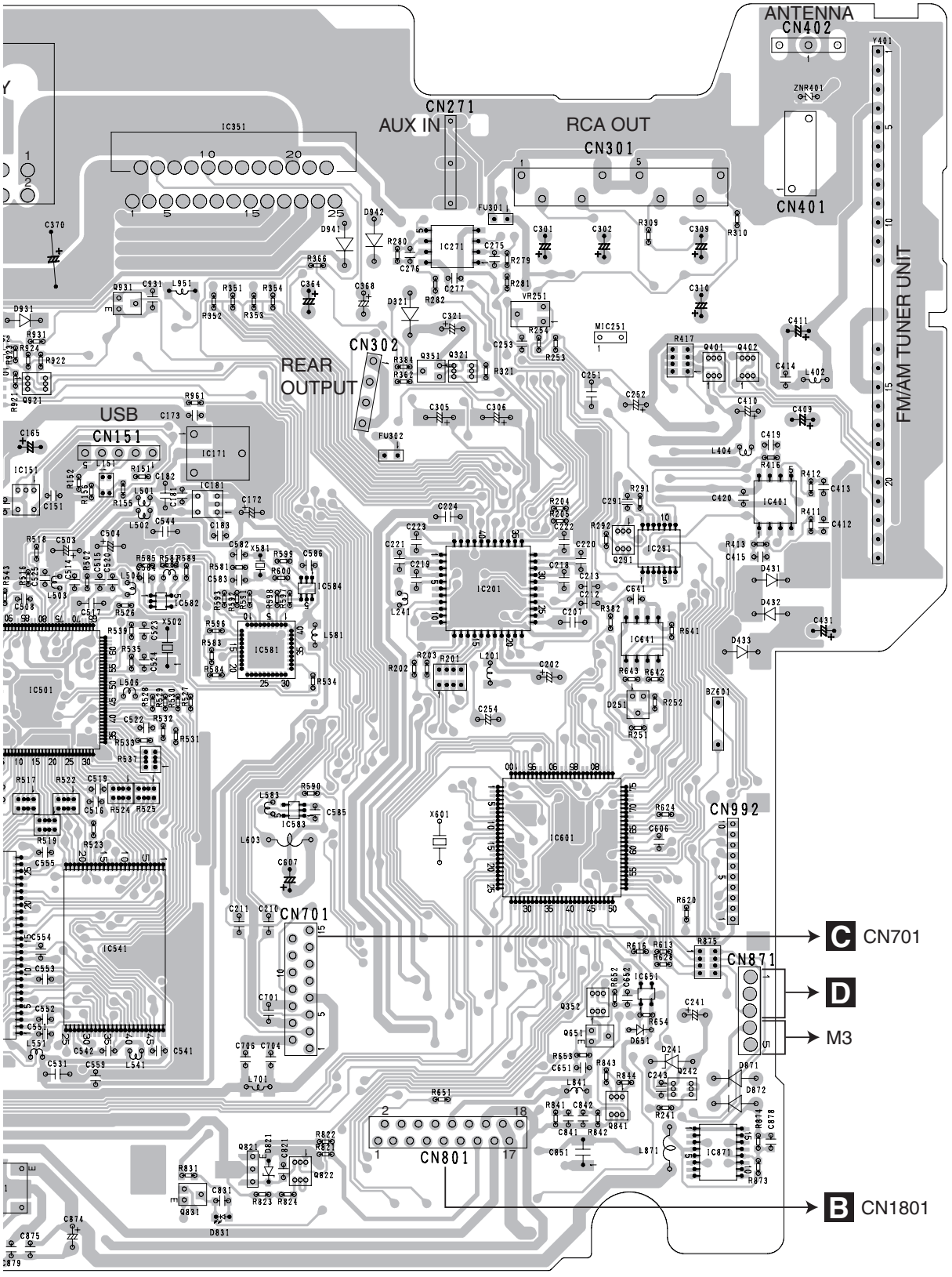
1. The parts mounted on this PCB include all necessary parts for several destination. For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



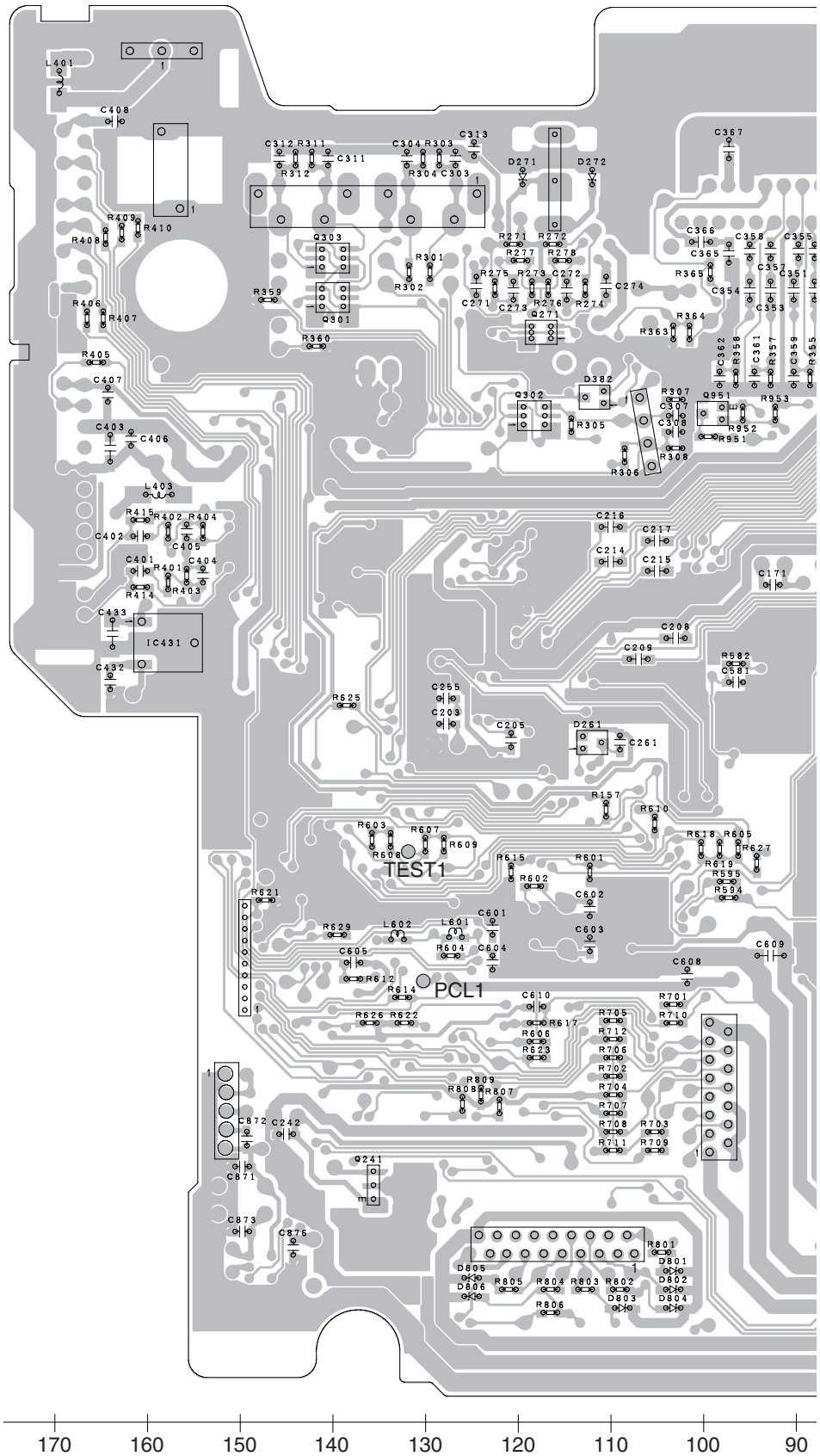
A TUNER AMP UNIT



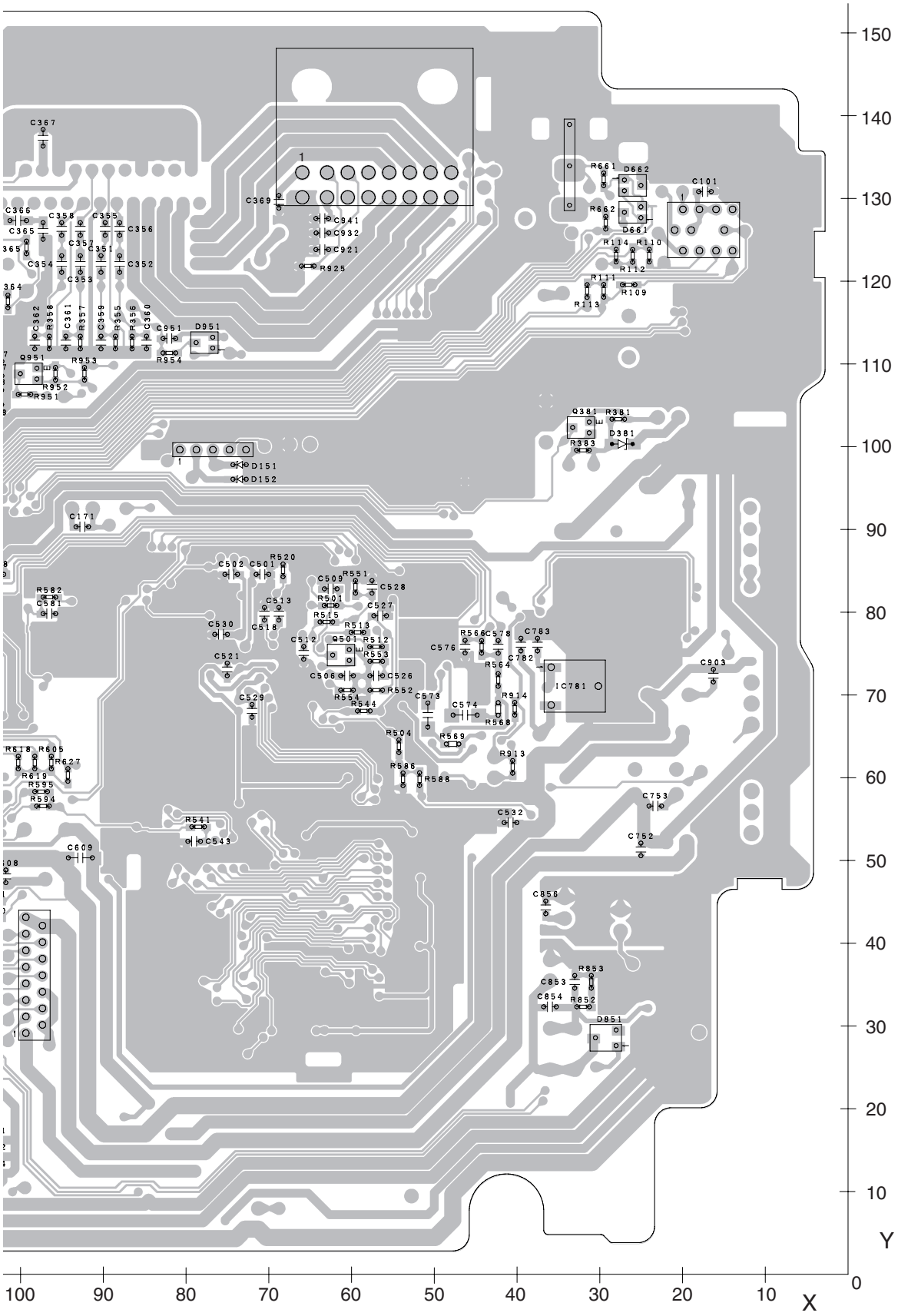
SIDE A


ANTENNA
CN402
CN271
AUX IN
RCA OUT
CN301
CN401
FM/AM TUNER UNIT
REAR
OUTPUT
CN302
USB
CN151
CN701
CN992
CN871
CN801
C CN701
D
M3
B CN1801
70 80 90 100 110 120 130 140 150 160 170
FRONT

A TUNER AMP UNIT



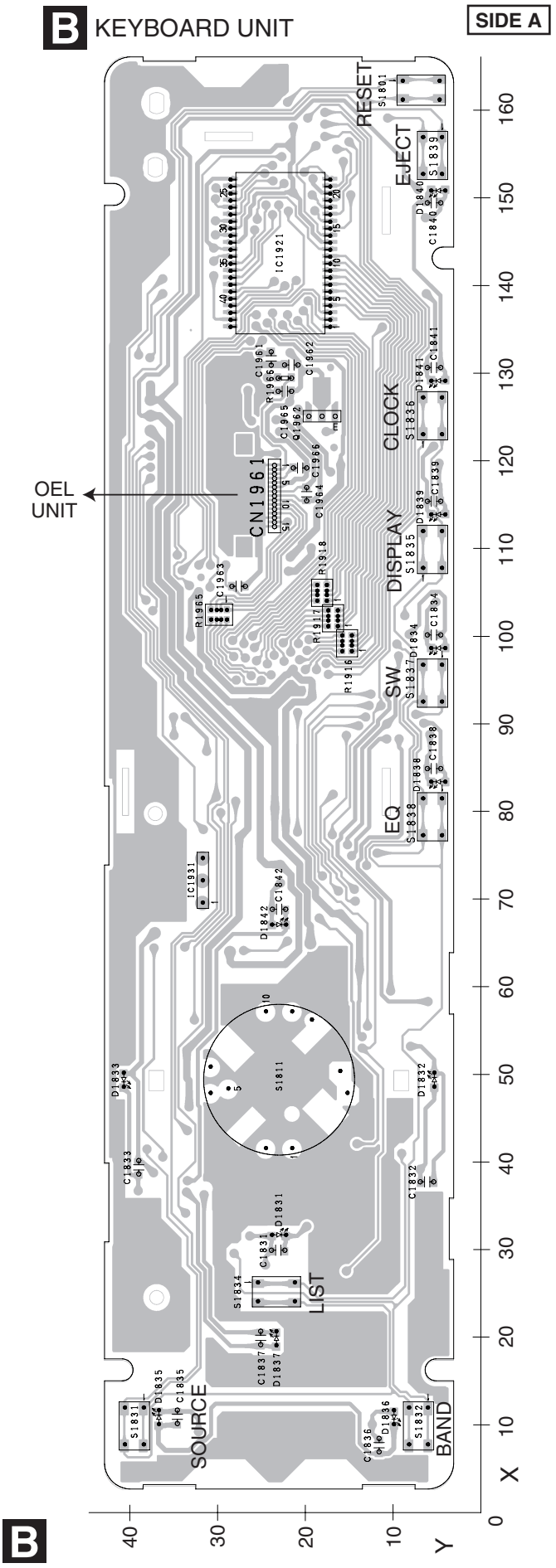
SIDE B

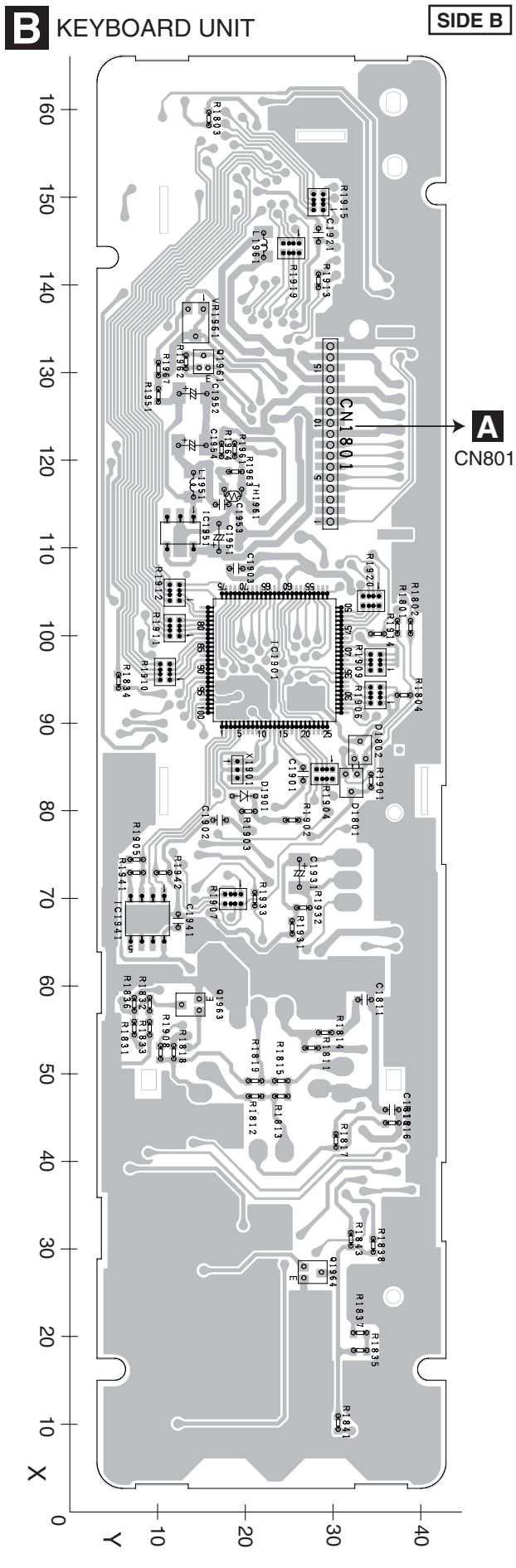


DEH-P690UB/XN/UC

5 6 7 8

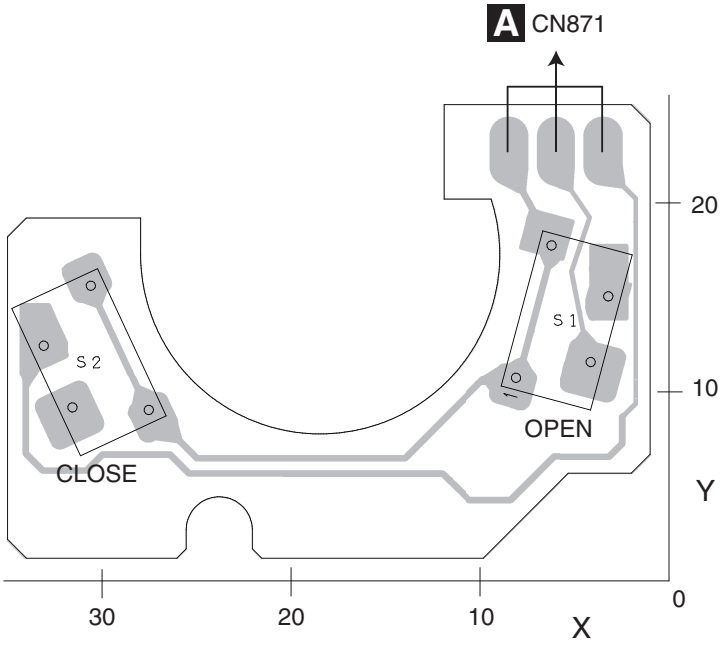
4.2 KEYBOARD UNIT





4.3 SWITCH UNIT

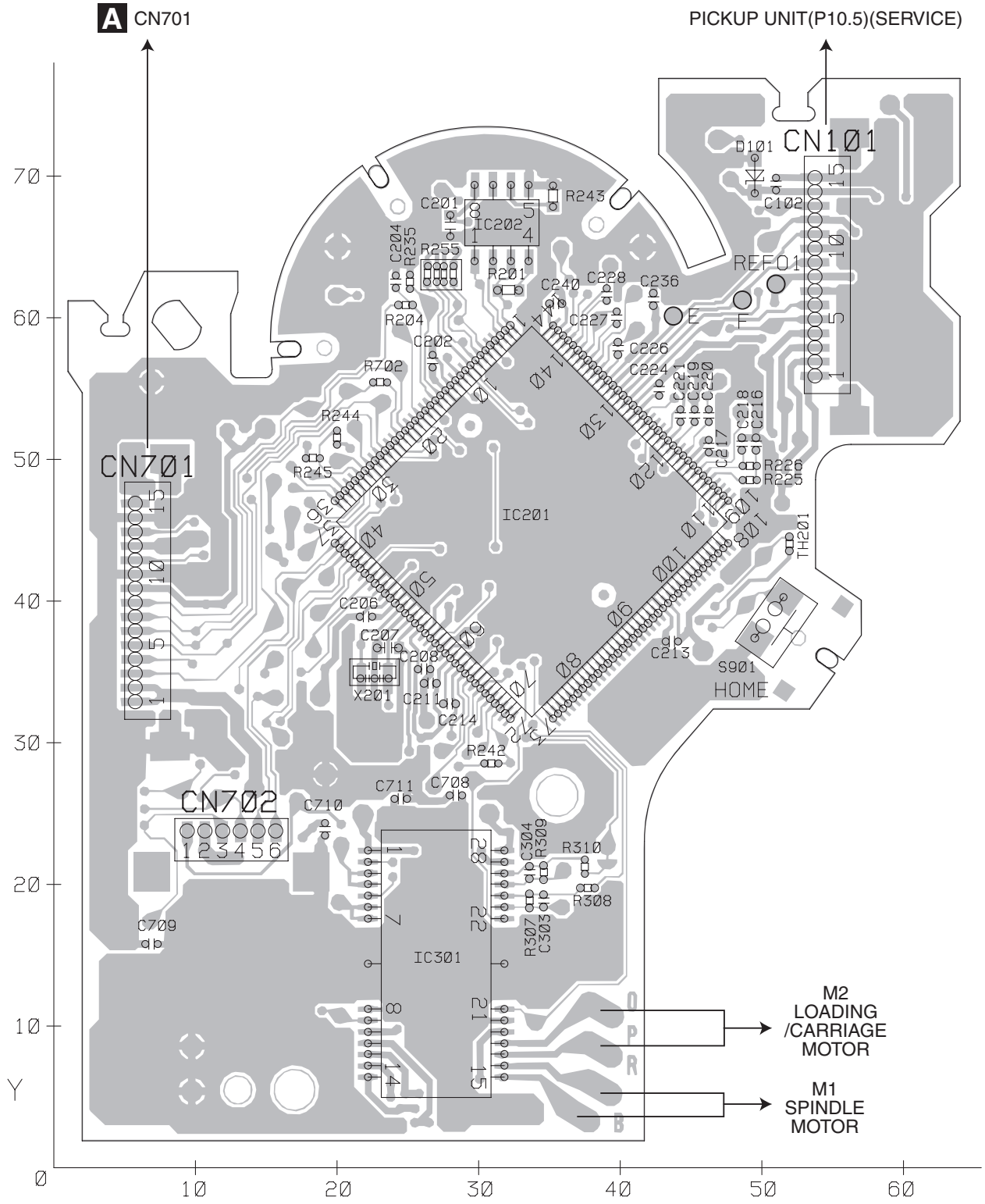
D SWITCH UNIT



4.4 CD CORE UNIT(S10.5COMP2)

C CD CORE UNIT(S10.5COMP2)

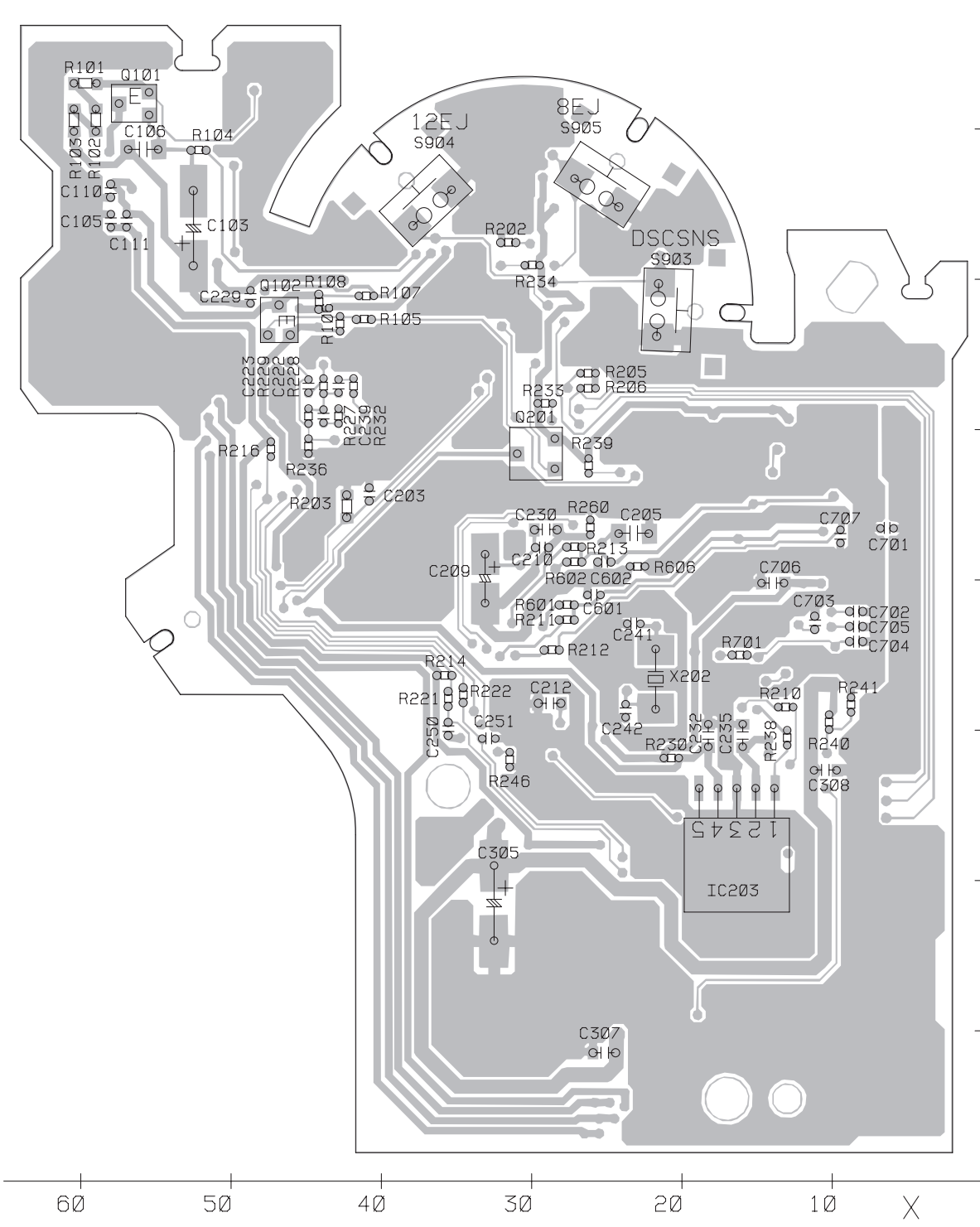
SIDE A



C

C CD CORE UNIT(S10.5COMP2)

SIDE B



5. ELECTRICAL PARTS LIST

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*
- *The part numbers shown below indicate chip components.*

  Chip Resistor

  RS1/◯S◯◯◯J,RS1/◯◯S◯◯◯J

  Chip Capacitor (except for CQS.....)

  CKS....., CCS....., CSZS.....
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Meaning of the figures and others in the parentheses in the parts list.*

Example) IC 301 is on the point (face A, 91 of x-axis, and 111 of y-axis) of the corresponding PC board.

IC 301 (A, 91, 111) IC NJM2068V

Circuit Symbol and No. **Part No.**

Unit Number : CWN2152(UC)

Unit Number : CWN2154(ES)

Unit Name : Tuner Amp Unit

Unit Number :

Unit Name : Keyboard Unit

Unit Number : CWX3514

Unit Name : CD Core

Unit(S10.5COMP2)

Unit Number : CWS1389

Unit Name : Switch Unit

A

Unit Number : CWN2152(UC)

Unit Number : CWN2154(ES)

Unit Name : Tuner Amp Unit

MISCELLANEOUS

IC 101	(A,12,115) IC	HA12241FP
IC 151	(A,66,94) IC	R5523N001B
IC 161	(A,44,96) IC	LT1766EFE-5
IC 171	(A,90,100) IC	NJM2885DL1-33
IC 181	(A,87,94) IC	NJM2872BF18
IC 201	(A,121,84) IC	PML016B
IC 271	(A,116,124) IC	NJM4558MD
IC 291	(A,141,88) IC	TC4066BFT
IC 351	(A,90,135) IC	PAL007C
IC 401	(A,155,94) IC	NJM062M
IC 431	(B,156,84) IC	NJM2885DL1-33
IC 501	(A,68,72) USB Media Control IC	TCC8600-00X-EA-AG
IC 541	(A,76,41) IC	PEH084A
IC 551	(A,60,41) SD-RAM(64M)	HY57V641620ETP-H
IC 561	(A,52,77) IC	AK4388VT
IC 562	(A,42,83) IC	NJM2872BF05
IC 563	(A,42,73) IC	NJM4558MD
IC 581	(A,94,76) IC	341S2025
IC 583	(A,98,57) L-MOS AND Gate	TC7SET08FUS1
IC 601	(A,129,54) IC	PEG301A
IC 651	(A,139,36) IC	S-80835CNNB-B8U
IC 781	(B,31,71) IC	NJM2885DL1-33
IC 851	(A,25,27) IC	NJM2360M
IC 871	(A,148,17) IC	BA6288FS
IC 911	(A,12,93) IC	NJM2388F84
IC 912	(A,44,52) IC	NJM2130F3
Q 101	(A,29,126) Transistor	UMF23N
Q 241	(B,134,26) Transistor	2SD1767
Q 242	(A,144,24) Transistor	UMD2N
Q 291	(A,137,89) Transistor	UMD2N
Q 301	(B,140,121) Transistor	IMH23
Q 302	(B,118,109) Transistor	IMH23
Q 303	(B,140,126) Transistor	IMH23
Q 321	(A,118,109) Transistor	UMD2N
Q 351	(A,114,109) Transistor	DTC124EUA
Q 352	(A,134,35) Transistor	UMD2N
Q 381	(B,32,102) Transistor	2SC4081
Q 501	(B,61,75) Transistor	DTC114EUA
Q 651	(A,134,31) Transistor	2SC4081
Q 751	(A,12,56) Transistor	2SD2396
Q 752	(A,18,60) Transistor	UMD2N
Q 821	(A,91,15) Transistor	2SD1767
Q 822	(A,98,15) Transistor	UMD2N
Q 831	(A,86,12) Transistor	DTC114EUA
Q 841	(A,136,22) Transistor	UMF23N
Q 851	(A,21,43) Transistor	2SD1760F5
Q 852	(A,21,34) Transistor	UMD2N
Q 871	(A,61,13) Transistor	2SD1760F5
Q 872	(A,49,6) Transistor	UMD2N
Q 901	(A,12,69) Transistor	2SD2396
Q 902	(A,12,77) Transistor	UMD2N
Q 921	(A,67,108) Transistor	UMX1N
Q 931	(A,78,117) Transistor	DTC114EUA
Q 951	(B,99,109) Transistor	2SA1576A
D 151	(B,74,98) Diode	MALS068X
D 152	(B,74,96) Diode	MALS068X
D 161	(A,50,96) Diode	1SS355
D 162	(A,50,102) Diode	RB160L-40
D 163	(A,46,107) Diode	1SR154-400

Circuit Symbol and No.		Part No.
D 241	(A,142,28) Diode	HZS12L(B1)
D 261	(B,112,73) Diode Network	DA204U
D 271	(B,120,134) Diode	MALS068X
D 272	(B,112,134) Diode	MALS068X
D 321	(A,111,116) Diode	1SS133
D 381	(B,27,100) Diode	HZU8R2(B2)
D 382	(B,112,111) Diode	DAN202U
D 431	(A,154,85) Diode	1SR154-400
D 432	(A,154,81) Diode	1SR154-400
D 433	(A,151,76) Diode	1SR154-400
D 661	(B,26,128) Diode(UC)	DAN202U
D 662	(B,26,132) Diode(UC)	DAP202U
D 751	(A,23,58) Diode	HZS7L(C3)
D 801	(B,103,16) Diode	MALS068X
D 802	(B,103,14) Diode	MALS068X
D 803	(B,109,12) Diode	MALS068X
D 804	(B,103,12) Diode	MALS068X
D 805	(B,125,16) Diode	MALS068X
D 806	(B,125,14) Diode	MALS068X
D 821	(A,95,15) Diode	HZU10(B1)
D 831	(A,89,9) LED	CL-197HB1-D(CDE)
D 851	(B,29,29) Diode	RB411D
D 852	(A,18,27) Diode	HZS11L(A1)
D 871	(A,150,26) Diode	1SS133
D 872	(A,150,23) Diode	1SS133
D 873	(A,53,7) Diode	HZS7L(A3)
D 901	(A,22,70) Diode	HZS6L(B1)
D 902	(A,27,113) Diode	MPG06G-6415G50
D 921	(A,42,128) Diode	HZS7L(C3)
D 922	(A,60,116) Diode	HZU6R8(B2)
D 931	(A,66,115) Diode	1SR154-400
D 941	(A,104,124) Diode	MPG06G-6415G50
D 942	(A,107,125) Diode	MPG06G-6415G50
D 951	(B,78,113) Diode	DAN202U
D 991	(A,35,121) Diode	MPG06G-6415G50
D 992	(A,42,131) Diode	MPG06G-6415G50
ZNR401	(A,159,142) Surge Protector	IMSA-6801-01Y901
L 101	(A,8,111) Inductor	LCTC2R2K1608
L 151	(A,75,96) Inductor	CTF1713
L 162	(A,57,98) Inductor	CTH1255
L 201	(A,121,74) Inductor	LCTAW2R2J2520
L 401	(B,170,145) Inductor	LCTAW220J2520
L 402	(A,159,108) Inductor	LCTAW1R0J3225
L 403	(B,159,100) Inductor	LCTAW1R0J3225
L 404	(A,151,100) Inductor	LCTC1R0K1608
L 501	(A,80,94) Inductor	CTF1389
L 502	(A,80,93) Inductor	CTF1389
L 503	(A,70,84) Inductor	LCTC2R2K1608
L 504	(A,78,84) Inductor	CTF1389
L 506	(A,78,71) Inductor	CTF1384
L 541	(A,79,29) Inductor	CTF1389
L 551	(A,67,28) Inductor	CTF1389
L 561	(A,54,71) Inductor	CTF1379
L 581	(A,100,78) Chip Coil	LCTAW100J2520
L 583	(A,95,58) Inductor	CTF1379
L 603	(A,97,54) Ferri-Inductor	LAU470K
L 841	(A,131,24) Chip Coil	LCTAW100J2520
L 851	(A,47,17) Chip Coil	LCTAW4R7J2520
L 852	(A,31,18) Inductor	CTF1660
L 871	(A,142,17) Ferri-Inductor	LAU4R7K

Circuit Symbol and No.		Part No.
L 951	(A,84,119) Inductor	CTF1617
X 502	(A,83,77) Crystal 12.000 MHz	CSS1723
X 581	(A,94,86) Crystal 32.768 kHz	CSS1735
X 601	(A,115,54) Crystal Resonator 15.000 MHz	CSS1653
⚠FU301	(A,122,127) Fuse 3 A	CEK1286
⚠FU302	(A,109,99) Fuse 3 A	CEK1286
BZ601	(A,148,68) Buzzer	CPV1062

RESISTORS

R 101	(A,12,121)	RS1/16S620J
R 103	(A,9,121)	RS1/16S101J
R 104	(A,15,121)	RS1/16S101J
R 105	(A,11,110)	RS1/16S102J
R 106	(A,27,125)	RS1/16S222J
R 107	(A,29,123)	RS1/16S332J
R 108	(A,31,123)	RS1/16S562J
R 109	(B,27,120)	RS1/16S181J
R 110	(B,24,123)	RS1/16S181J
R 111	(B,30,119)	RS1/16S223J
R 112	(B,26,123)	RS1/16S223J
R 113	(B,32,119)	RS1/16S102J
R 114	(B,28,123)	RS1/16S102J
R 151	(A,80,97)	RS1/16S0R0J
R 152	(A,72,96)	RS1/16S0R0J
R 155	(A,77,95)	RS1/16S153J
R 156	(A,74,95)	RS1/16S153J
R 157	(B,111,66)	RS1/16S103J
R 161	(A,50,94)	RS1/16S0R0J
R 163	(A,43,90)	RS1/16S332J
R 201	(A,116,73)	RAB4C102J
R 202	(A,112,74)	RS1/16S101J
R 203	(A,113,74)	RS1/16S101J
R 204	(A,129,93)	RS1/16S0R0J
R 205	(A,129,92)	RS1/16S0R0J
R 241	(A,142,22)	RS1/16S182J
R 271	(B,121,127)	RS1/16S473J
R 272	(B,116,127)	RS1/16S473J
R 273	(B,119,122)	RS1/16S223J
R 274	(B,113,122)	RS1/16S223J
R 275	(B,123,122)	RS1/16S223J
R 276	(B,117,122)	RS1/16S223J
R 277	(B,120,125)	RS1/16S223J
R 278	(B,115,125)	RS1/16S223J
R 279	(A,123,123)	RS1/16S223J
R 280	(A,110,123)	RS1/16S223J
R 291	(A,139,94)	RS1/16S103J
R 292	(A,135,89)	RS1/16S472J
R 301	(B,130,124)	RS1/16S390J
R 302	(B,132,124)	RS1/16S390J
R 303	(B,129,136)	RS1/16S223J
R 304	(B,130,136)	RS1/16S223J
R 305	(B,114,108)	RS1/16S390J
R 306	(B,109,104)	RS1/16S390J
R 307	(B,103,110)	RS1/16S223J
R 308	(B,103,105)	RS1/16S223J
R 309	(A,140,125)	RS1/16S390J
R 310	(A,150,127)	RS1/16S390J
R 311	(B,142,136)	RS1/16S223J
R 312	(B,144,136)	RS1/16S223J

Circuit Symbol and No.		Part No.
R 321	(A,120,109)	RS1/16S102J
R 351	(A,90,118)	RS1/16S182J
R 352	(A,88,118)	RS1/16S182J
R 353	(A,93,118)	RS1/16S182J
R 354	(A,95,118)	RS1/16S182J
R 355	(B,89,113)	RS1/16S272J
R 356	(B,87,113)	RS1/16S272J
R 357	(B,93,113)	RS1/16S272J
R 358	(B,97,113)	RS1/16S272J
R 359	(B,147,121)	RS1/16S472J
R 360	(B,142,116)	RS1/16S472J
R 362	(A,111,108)	RS1/16S103J
R 363	(B,103,118)	RS1/16S103J
R 364	(B,102,118)	RS1/16S331J
R 365	(B,99,124)	RS1/16S101J
R 366	(A,100,122)	RS1/16S103J
R 381	(B,28,103)	RS1/16S473J
R 382	(A,135,80)	RS1/16S473J
R 383	(B,32,100)	RS1/16S104J
R 384	(A,111,110)	RS1/16S473J
R 403	(B,156,91)	RS1/16S104J
R 404	(B,154,96)	RS1/16S104J
R 405	(B,166,114)	RS1/16S681J
R 407	(B,165,119)	RS1/16S681J
R 408	(B,165,128)	RS1/16S681J
R 409	(B,163,128)	RS1/16S681J
R 410	(B,161,129)	RS1/16S681J
R 501	(B,63,81)	RS1/16S471J
R 502	(A,73,84)	RS1/16S0R0J
R 504	(B,54,64)	RS1/16S101J
R 505	(A,56,64)	RAB4CQ101J
R 507	(A,56,84)	RS1/16S101J
R 508	(A,57,84)	RS1/16S101J
R 510	(A,55,59)	RAB4CQ101J
R 511	(A,60,55)	RS1/16S101J
R 512	(B,57,76)	RS1/16S471J
R 513	(B,59,78)	RS1/16S471J
R 514	(A,61,56)	RS1/16S101J
R 515	(B,63,79)	RS1/16S471J
R 516	(A,66,85)	RS1/16S390J
R 517	(A,66,58)	RAB4CQ101J
R 518	(A,67,88)	RS1/16S390J
R 519	(A,68,56)	RAB4CQ101J
R 520	(B,68,85)	RS1/16S104J
R 522	(A,71,58)	RAB4CQ101J
R 523	(A,74,55)	RS1/16S101J
R 524	(A,77,59)	RAB4CQ101J
R 525	(A,80,59)	RAB4CQ101J
R 526	(A,78,82)	RS1/16S472J
R 527	(A,85,70)	RS1/16S101J
R 528	(A,81,70)	RS1/16S473J
R 529	(A,82,70)	RS1/16S101J
R 530	(A,84,70)	RS1/16S471J
R 531	(A,84,66)	RS1/16S101J
R 532	(A,82,67)	RS1/16S101J
R 533	(A,80,66)	RS1/16S101J
R 535	(A,78,75)	RS1/16S102J
R 536	(A,57,55)	RAB4CQ101J
R 537	(A,81,63)	RAB4CQ101J
R 538	(A,57,73)	RS1/16S101J

Circuit Symbol and No.		Part No.
R 539	(A,78,79)	RS1/16S225J
R 541	(B,79,54)	RS1/16S0R0J
R 542	(A,62,83)	RS1/16S101J
R 543	(A,63,83)	RS1/16S101J
R 544	(B,59,68)	RS1/16S101J
R 550	(A,56,69)	RS1/16S472J
R 551	(B,60,83)	RS1/16S223J
R 552	(B,57,71)	RS1/16S223J
R 553	(B,57,74)	RS1/16S223J
R 554	(B,61,71)	RS1/16S473J
R 555	(A,52,46)	RS1/16S222J
R 556	(A,52,43)	RS1/16S222J
R 561	(A,50,62)	RS1/16S473J
R 562	(A,49,62)	RS1/16S473J
R 563	(A,43,66)	RS1/16S103J
R 564	(B,42,72)	RS1/16S103J
R 565	(A,41,67)	RS1/16S103J
R 566	(B,44,76)	RS1/16S103J
R 567	(A,57,74)	RS1/16S101J
R 568	(B,42,68)	RS1/16S822J
R 569	(B,48,64)	RS1/16S822J
R 582	(B,97,82)	RS1/16S103J
R 583	(A,88,76)	RS1/16S103J
R 584	(A,88,73)	RS1/16S1003F
R 585	(A,80,86)	RS1/16S332J
R 586	(B,54,60)	RS1/16S332J
R 587	(A,83,86)	RS1/16S182J
R 588	(B,52,60)	RS1/16S182J
R 590	(A,100,59)	RS1/16S101J
R 591	(A,92,82)	RS1/16S104J
R 592	(A,91,82)	RS1/16S104J
R 593	(A,89,82)	RS1/16S104J
R 594	(B,97,57)	RS1/16S332J
R 595	(B,98,58)	RS1/16S182J
R 596	(A,88,79)	RS1/16S104J
R 597	(A,97,82)	RS1/16S0R0J
R 600	(A,96,85)	RS1/16S0R0J
R 601	(B,112,59)	RS1/16S104J
R 602	(B,118,58)	RS1/16S0R0J
R 603	(B,136,63)	RS1/16S104J
R 604	(B,127,50)	RS1/16S104J
R 605	(B,96,62)	RS1/16S472J
R 606	(B,118,41)	RS1/16S472J
R 607	(B,130,62)	RS1/16S104J
R 608	(B,134,63) (ES)	RS1/16S0R0J
R 609	(B,128,62) (UC)	RS1/16S0R0J
R 610	(B,105,65)	RS1/16S102J
R 612	(B,138,48)	RS1/16S681J
R 613	(A,141,41)	RS1/16S104J
R 615	(B,121,59)	RS1/16S104J
R 616	(A,139,41)	RS1/16S104J
R 617	(B,118,43)	RS1/16S222J
R 618	(B,100,62)	RS1/16S104J
R 619	(B,98,62)	RS1/16S104J
R 620	(A,144,45)	RS1/16S102J
R 621	(B,147,56)	RS1/16S104J
R 622	(B,132,43)	RS1/16S104J
R 623	(B,118,39)	RS1/16S472J
R 624	(A,142,57)	RS1/16S472J
R 625	(B,139,77)	RS1/16S103J

Circuit Symbol and No.			Part No.
R 626	(B,136,43)		RS1/16S104J
R 627	(B,94,60)		RS1/16S104J
R 628	(A,141,39)		RS1/16S104J
R 629	(B,140,53)		RS1/16S104J
R 643	(A,138,73)		RS1/16S104J
R 651	(A,115,23)		RS1/16S222J
R 652	(A,136,35)		RS1/16S102J
R 653	(A,132,28)		RS1/16S473J
R 654	(A,139,33)		RS1/16S183J
R 661	(B,30,132)	(UC)	RS1/16S102J
R 662	(B,29,127)	(UC)	RS1/16S102J
R 701	(B,103,45)		RS1/16S104J
R 702	(B,110,37)		RS1/16S473J
R 703	(B,105,31)		RS1/16S682J
R 704	(B,110,35)		RS1/16S682J
R 705	(B,110,43)		RS1/16S221J
R 706	(B,110,39)		RS1/16S102J
R 707	(B,110,33)		RS1/16S221J
R 708	(B,110,31)		RS1/16S221J
R 709	(B,105,29)		RS1/16S221J
R 710	(B,103,43)		RS1/16S102J
R 711	(B,110,29)		RS1/16S104J
R 712	(B,110,41)		RS1/16S104J
R 751	(A,23,61)		RD1/4PU102J
R 801	(B,105,18)		RS1/16S222J
R 802	(B,109,14)		RS1/16S222J
R 803	(B,113,14)		RS1/16S222J
R 804	(B,117,14)		RS1/16S222J
R 805	(B,121,14)		RS1/16S222J
R 806	(B,117,12)		RS1/16S104J
R 807	(B,122,34)		RS1/16S104J
R 809	(B,124,35)		RS1/16S223J
R 821	(A,101,17)		RS1/16S473J
R 822	(A,101,18)		RS1/16S1R0J
R 823	(A,94,12)		RS1/16S221J
R 824	(A,97,12)		RS1/16S221J
R 831	(A,85,14)		RS1/16S181J
R 842	(A,134,21)		RS1/16S472J
R 843	(A,135,26)		RS1/16S472J
R 844	(A,137,25)		RS1/16S103J
R 851	(A,36,27)		RD1/4PU272J
R 852	(B,32,32)		RS1/16S101J
R 854	(A,21,23)		RS1/16S391J
R 855	(A,24,23)		RS1/16S1R0J
R 856	(A,22,36)		RS1/16S331J
R 857	(A,21,31)		RS1/16S331J
R 858	(A,33,27)		RD1/4PU272J
R 871	(A,50,10)		RS1/16S471J
R 872	(A,48,10)		RS1/16S471J
R 873	(A,153,15)		RS1/16S103J
R 874	(A,153,18)		RS1/16S563J
R 875	(A,147,39)		RAB4C102J
R 901	(A,17,71)		RS1/16S223J
R 902	(A,18,78)		RS1/16S472J
R 911	(A,17,83)		RS1/16S102J
R 912	(A,17,86)		RS1/16S473J
R 913	(B,41,61)		RS1/16S103J
R 914	(B,40,68)		RS1/16S103J
R 921	(A,65,108)		RS1/16S103J
R 922	(A,68,111)		RS1/16S103J
R 923	(A,65,111)		RS1/16S473J
R 924	(A,66,111)		RS1/16S223J
R 925	(B,65,122)		RS1/16S472J
R 931	(A,67,113)		RS1/16S103J
R 951	(B,100,106)		RS1/16S102J
R 952	(B,96,109)		RS1/16S472J
R 953	(B,92,109)		RS1/16S472J
R 954	(B,82,111)		RS1/16S153J

CAPACITORS

C 101	(B,17,131)		CKSRYB104K16
C 102	(A,15,119)		CKSRYB102K50
C 103	(A,12,119)		CKSRYB102K50
C 151	(A,69,95)		CKSRYB104K16
C 152	(A,63,93)		CKSRYB104K16
C 161	(A,37,103)	470 µF/16 V	CCH1331
C 162	(A,44,103)		CKSYB225K16
C 163	(A,49,97)		CKSRYB334K10
C 164	(A,42,90)		CKSRYB472K50
C 165	(A,66,100)		CEHAZA101M6R3
C 166	(A,44,88)		CKSRYB473K25
C 171	(B,93,90)		CKSRYB103K50
C 172	(A,93,93)		CEAL220M16
C 173	(A,86,104)		CKSRYB474K10
C 181	(A,84,95)		CKSRYB104K16
C 182	(A,82,95)		CKSYB106K6R3
C 183	(A,89,90)		CKSRYB104K16
C 202	(A,128,73)		CEAL470M10
C 203	(B,128,75)		CKSRYB104K16
C 205	(B,121,74)		CKSRYB474K10
C 207	(A,131,80)		CKSYB106K10
C 208	(B,103,85)		CKSQYB225K10
C 209	(B,107,82)		CKSQYB225K10
C 210	(A,95,44)		CKSQYB225K10
C 211	(A,91,44)		CKSQYB225K10
C 212	(A,133,82)		CKSQYB225K10
C 213	(A,133,84)		CKSQYB225K10
C 214	(B,110,93)		CKSQYB225K10
C 215	(B,105,92)		CKSQYB225K10
C 216	(B,110,97)		CKSQYB225K10
C 217	(B,105,95)		CKSQYB225K10
C 218	(A,130,85)		CKSQYB475K10
C 219	(A,112,85)		CKSQYB475K10
C 220	(A,132,87)		CKSQYB475K10
C 221	(A,110,87)		CKSQYB475K10
C 222	(A,130,89)		CKSQYB475K10
C 223	(A,112,89)		CKSQYB475K10
C 224	(A,116,92)		CKSYB106K10
C 241	(A,145,33)		CEAL470M16
C 242	(B,145,31)		CKSRYB104K16
C 243	(A,141,24)		CKSRYB224K16
C 255	(B,128,78)		CKSRYB104K16
C 261	(B,109,73)		CCSRCH470J50
C 271	(B,125,123)		CKSQYB225K10
C 272	(B,115,122)		CKSQYB225K10
C 273	(B,121,122)		CKSQYB225K10
C 274	(B,111,123)		CKSQYB225K10
C 275	(A,121,123)		CCSRCH101J50
C 276	(A,111,123)		CCSRCH101J50
C 277	(A,117,120)		CKSRYB105K10

Circuit Symbol and No.			Part No.
C 291	(A,137,94)		CKSRYB104K16
C 301	(A,127,124)		CEAL100M25
C 302	(A,134,124)		CEAL100M25
C 305	(A,115,104)		CEVW100M10
C 306	(A,122,104)		CEVW100M10
C 309	(A,146,124)		CEAL100M25
C 310	(A,146,117)		CEAL100M25
C 321	(A,116,114)		CEAL220M16
C 351	(B,90,122)		CKSQYB474K16
C 352	(B,88,122)		CKSQYB474K16
C 353	(B,93,122)		CKSQYB474K16
C 354	(B,95,122)		CKSQYB474K16
C 355	(B,90,126)		CKSRYB474K16
C 356	(B,88,126)		CKSRYB474K16
C 357	(B,93,126)		CKSRYB474K16
C 358	(B,95,126)		CKSRYB474K16
C 364	(A,99,118)		CEHAR330M10
C 365	(B,97,126)		CKSQYB225K10
C 366	(B,100,127)		CKSQYB225K10
C 368	(A,106,117)		CEHAS100M35
C 369	(B,69,130)		CKSRYB104K16
C 370	(A,69,123)	3 300 µF/16 V	CCH1486
C 401	(B,161,92)		CKSRYB104K16
C 402	(B,161,96)		CKSRYB104K16
C 403	(B,164,105)		CKSYB475K10
C 406	(B,162,106)		CKSRYB103K50
C 407	(B,164,111)		CKSRYB103K50
C 408	(B,164,140)		CKSRYB103K50
C 409	(A,158,104)		CEJQ470M10
C 410	(A,151,105)		CEAL470M6R3
C 411	(A,157,114)		CEJQ101M16
C 420	(A,151,94)		CKSRYB104K16
C 431	(A,160,79)		CEJQ220M16
C 432	(B,164,80)		CKSRYB103K50
C 433	(B,164,85)		CKSYB475K10
C 501	(B,71,85)		CKSRYB104K16
C 502	(B,75,85)		CKSRYB104K16
C 503	(A,71,88)		CSZSR100M16
C 504	(A,76,89)		CSZSR100M16
C 505	(A,55,67)		CKSRYB104K16
C 506	(B,61,72)		CKSRYB104K16
C 507	(A,57,67)		CKSRYB104K16
C 508	(A,66,82)		CKSRYB104K16
C 509	(B,63,83)		CCSRCH100D50
C 510	(A,62,60)		CKSRYB104K16
C 511	(A,62,59)		CKSRYB104K16
C 512	(B,66,75)		CKSRYB104K16
C 513	(B,69,80)		CCSRCH331J50
C 515	(A,75,84)		CKSRYB102K50
C 516	(A,74,58)		CKSRYB104K16
C 517	(A,74,82)		CKSYB475K10
C 518	(B,71,80)		CKSRYB122K50
C 519	(A,74,60)		CKSRYB104K16
C 520	(A,76,84)		CKSRYB102K50
C 521	(B,75,73)		CKSRYB104K16
C 522	(A,80,67)		CKSRYB104K16
C 523	(A,80,79)		CCSRCH5R0C50
C 524	(A,80,75)		CCSRCH150J50
C 525	(A,68,85)		CKSRYB103K50
C 526	(B,57,72)		CCSRCH100D50
C 527	(B,57,80)		CCSRCH100D50
C 528	(B,58,83)		CCSRCH100D50
C 529	(B,72,68)		CKSRYB104K16
C 530	(B,76,77)		CKSRYB104K16
C 531	(A,70,26)		CKSYB106K6R3
C 532	(B,41,55)		CKSRYB103K50
C 533	(A,49,85)		CKSRYB102K50
C 541	(A,82,29)		CKSRYB104K16
C 542	(A,76,29)		CKSRYB104K16
C 544	(A,82,90)		CKSYB106K6R3
C 551	(A,68,31)		CKSRYB104K16
C 552	(A,68,33)		CKSRYB104K16
C 553	(A,68,37)		CKSRYB104K16
C 554	(A,68,41)		CKSRYB104K16
C 555	(A,68,52)		CKSRYB104K16
C 556	(A,52,33)		CKSRYB104K16
C 557	(A,52,38)		CKSRYB104K16
C 559	(A,74,26)		CKSRYB102K50
C 561	(A,53,68)		CKSRYB104K16
C 564	(A,51,69)		CKSYB106K6R3
C 566	(A,43,80)		CKSRYB103K50
C 567	(A,52,71)		CKSRYB103K50
C 568	(A,45,85)		CKSRYB105K10
C 569	(A,52,66)		CKSYB106K6R3
C 570	(A,50,68)		CKSRYB104K16
C 571	(A,43,85)		CKSRYB104K16
C 572	(A,45,82)		CKSRYB104K16
C 573	(B,51,68)		CKSYB475K10
C 574	(B,46,68)		CKSYB475K10
C 575	(A,43,68)		CCSRCH151J50
C 576	(B,46,76)		CCSRCH151J50
C 577	(A,39,69)		CCSRCH331J50
C 578	(B,42,76)		CCSRCH331J50
C 579	(A,38,75)		CKSRYB105K10
C 581	(B,97,80)		CKSRYB104K16
C 582	(A,91,88)		CCSRCH5R0C50
C 583	(A,91,85)		CCSRCH5R0C50
C 585	(A,100,57)		CKSRYB104K16
C 602	(B,112,55)		CCSRCH220J50
C 603	(B,112,52)		CCSRCH180J50
C 604	(B,123,50)		CKSRYB104K16
C 606	(A,141,54)		CKSRYB104K16
C 607	(A,97,49)		CEAL4R7M35
C 608	(B,102,48)		CKSRYB103K50
C 609	(B,93,50)		CKSYB106K6R3
C 651	(A,132,27)		CKSRYB104K16
C 652	(A,137,35)		CKSRYB105K10
C 701	(A,95,33)		CKSQYB475K6R3
C 751	(A,21,52)		CEHAR101M10
C 752	(B,25,51)		CKSRYB102K50
C 753	(B,23,57)		CKSRYB473K25
C 781	(A,37,64)		CEJQ220M25
C 782	(B,40,76)		CKSRYB103K50
C 783	(B,38,76)		CKSRYB474K10
C 821	(A,96,15)		CKSRYB473K25
C 831	(A,89,11)		CKSRYF104Z50
C 841	(A,130,21)		CKSRYB473K25
C 842	(A,132,21)		CCSRCH101J50
C 851	(A,132,17)	4.7 µF	CCG1111
C 852	(A,36,37)		CEJQ470M25

Circuit Symbol and No.		Part No.
C 854	(B,36,32)	CKSRYB103K50
C 855	(A,30,28)	CCSRCH331J50
C 856	(B,37,44)	CKSRYB104K16
C 857	(A,34,44)	CEJQ101M16
C 858	(A,28,43)	CEJQ470M16
C 859	(A,19,33)	CKSRYB104K16
C 860	(A,27,35) 22 µF	CCG1183
C 871	(B,150,28)	CCSRCH101J50
C 872	(B,149,31)	CKSRYB102K50
C 873	(B,150,21)	CCSRCH101J50
C 874	(A,71,7)	CEAL101M10
C 875	(A,66,5)	CKSRYB104K16
C 876	(B,144,19)	CKSRYB105K10
C 877	(A,62,5)	CKSRYB103K50
C 878	(A,154,18)	CKSRYB103K50
C 901	(A,21,66)	CEHAR220M16
C 902	(A,17,65)	CKSRYB104K16
C 903	(B,16,72)	CKSRYB103K50
C 904	(A,31,90) 1 500 µF/16 V	CCH1201
C 911	(A,22,95)	CEJQ221M16
C 912	(A,17,89)	CKSRYB103K50
C 913	(A,22,104)	CEJQ101M16
C 914	(A,43,61)	CEJQ100M50
C 915	(A,44,55)	CKSRYB105K10
C 921	(B,64,124)	CKSRYB104K16
C 931	(A,81,118)	CKSQYB105K16
C 932	(B,64,126)	CKSRYB473K25
C 941	(B,64,128)	CKSRYB473K25
C 951	(B,82,113)	CKSRYB104K16

B

Unit Number :
Unit Name : Keyboard Unit

MISCELLANEOUS

IC 1901	(B,97,23) IC	PEG312A8
IC 1921	(A,144,23) IC(P690UB)	PD8174A
	IC(P6900UB,P7950UB)	PD8173A
IC 1931	(A,72,32) IC	GP1UX31RK
IC 1951	(B,112,13) IC	S-818A33AUC-BGN
Q 1961	(B,131,15) Transistor	2SC4617
Q 1962	(A,127,18) Transistor	2SD1664
Q 1963	(B,58,14) Transistor	DTC123JU
Q 1964	(B,27,28) Transistor	DTC123JU
D 1831	(A,32,23) LED	CL-197HB1-D(CDE)
D 1832	(A,49,5) LED	CL-197HB1-D(CDE)
D 1833	(A,49,41) LED	CL-197HB1-D(CDE)
D 1834	(A,99,5) LED	CL-197HB1-D(CDE)
D 1835	(A,11,37) LED	CL-197HB1-D(CDE)
D 1836	(A,11,10) LED	CL-197HB1-D(CDE)
D 1837	(A,20,23) LED	CL-197HB1-D(CDE)
D 1838	(A,83,5) LED	CL-197HB1-D(CDE)
D 1839	(A,114,5) LED	CL-197HB1-D(CDE)
D 1840	(A,151,5) LED	CL-197HB1-D(CDE)
D 1841	(A,129,5) LED	CL-197HB1-D(CDE)
D 1842	(A,67,23) LED	CL-197HB1-D(CDE)
D 1901	(B,82,20) Diode	1SS355
L 1951	(B,117,14) Inductor	CTF1617
L 1961	(B,145,22) Inductor	CTF1617

Circuit Symbol and No.		Part No.
TH1961	(B,117,19) Thermistor	CCX1037
X 1901	(B,85,19) Ceramic Resonator 16.000 MHz	CSS1616
S 1801	(A,162,7) Push Switch	CSG1155
S 1811	(A,49,23) Switch	CSX1120
S 1831	(A,10,40) Push Switch	CSG1155
S 1832	(A,10,7) Push Switch	CSG1155
S 1834	(A,25,23) Push Switch	CSG1155
S 1835	(A,110,6) Push Switch	CSG1155
S 1836	(A,125,6) Push Switch	CSG1155
S 1837	(A,95,6) Push Switch	CSG1155
S 1838	(A,79,6) Push Switch	CSG1155
S 1839	(A,155,6) Push Switch	CSG1155

RESISTORS

R 1801	(B,101,37)	RS1/16S222J
R 1802	(B,101,39)	RS1/16S222J
R 1803	(B,159,16)	RS1/16S333J
R 1811	(B,53,28)	RS1/16S103J
R 1812	(B,47,21)	RS1/16S333J
R 1813	(B,47,24)	RS1/16S103J
R 1814	(B,55,29)	RS1/16S102J
R 1815	(B,49,24)	RS1/16S332J
R 1816	(B,44,37)	RS1/16S102J
R 1818	(B,52,12)	RS1/16S103J
R 1819	(B,49,21)	RS1/16S222J
R 1831	(B,55,7)	RS1/16S821J
R 1832	(B,58,9)	RS1/16S271J
R 1833	(B,55,9)	RS1/16S0R0J
R 1834	(B,95,6)	RS1/16S821J
R 1835	(B,18,33)	RS1/16S271J
R 1836	(B,58,7)	RS1/16S821J
R 1837	(B,20,33)	RS1/16S0R0J
R 1838	(B,30,35)	RS1/16S821J
R 1841	(B,10,31)	RS1/16S821J
R 1843	(B,31,32)	RS1/16S821J
R 1901	(B,83,34)	RS1/16S103J
R 1902	(B,79,25)	RS1/16S473J
R 1903	(B,80,20)	RS1/16S154J
R 1904	(B,84,29)	RAB4CQ102J
R 1905	(B,74,8)	RS1/16S104J
R 1906	(B,93,35)	RAB4CQ473J
R 1907	(B,70,19)	RAB4CQ102J
R 1908	(B,52,10)	RS1/16S221J
R 1909	(B,97,35)	RAB4CQ473J
R 1910	(B,96,11)	RAB4CQ101J
R 1911	(B,101,12)	RAB4CQ101J
R 1912	(B,105,12)	RAB4CQ101J
R 1913	(B,140,28)	RS1/16S101J
R 1914	(B,100,35)	RS1/16S101J
R 1915	(B,149,28)	RAB4CQ101J
R 1916	(A,99,15)	RAB4CQ101J
R 1917	(A,102,17)	RAB4CQ101J
R 1918	(A,105,18)	RAB4CQ101J
R 1919	(B,144,25)	RAB4CQ101J
R 1920	(B,104,34)	RAB4CQ101J
R 1931	(B,67,25)	RS1/16S101J
R 1932	(B,69,27)	RS1/16S103J
R 1933	(B,70,21)	RS1/16S2R2J
R 1951	(B,127,10)	RS1/16S222J

Circuit Symbol and No.		Part No.
R 1961	(B,121,19)	RS1/16S333J
R 1962	(B,131,13)	RS1/16S183J
R 1963	(B,119,19)	RS1/16S563J
R 1964	(B,121,17)	RS1/16S392J
R 1965	(A,102,30)	RAB4CQ101J
R 1966	(A,129,22)	RS1/16S0R0J
R 1967	(B,130,10)	RS1/16S5101D

CAPACITORS

C 1831	(A,30,23)	CKSRYF104Z50
C 1832	(A,38,6)	CKSRYF104Z50
C 1833	(A,39,39)	CKSRYF104Z50
C 1834	(A,100,5)	CKSRYF104Z50
C 1835	(A,11,35)	CKSRYF104Z50
C 1836	(A,8,12)	CKSRYF104Z50
C 1837	(A,20,25)	CKSRYF104Z50
C 1838	(A,85,5)	CKSRYF104Z50
C 1839	(A,115,5)	CKSRYF104Z50
C 1840	(A,149,5)	CKSRYF104Z50
C 1841	(A,131,5)	CKSRYF104Z50
C 1842	(A,69,23)	CKSRYF104Z50
C 1901	(B,84,27)	CKSRYB103K50
C 1902	(B,79,17)	CKSRYF104Z50
C 1903	(B,108,19)	CKSRYB103K50
C 1921	(B,146,28)	CKSRYB103K50
C 1931	(B,73,26)	CSZSR100M16
C 1951	(B,111,17)	CSZSR4R7M16
C 1952	(B,128,14)	CSZSR4R7M16
C 1953	(B,115,17)	CKSRYB103K50
C 1954	(B,122,14)	CSZSR4R7M10
C 1963	(A,106,28)	CKSRYB104K25
C 1964	(A,116,20)	CKSRYB104K25
C 1965	(A,128,22)	CKSRYB104K25
C 1966	(A,119,21)	CKSRYB104K25

C

Unit Number : CWX3514
Unit Name : CD Core Unit(S10.5COMP2)

MISCELLANEOUS

IC 201	(A,34,46)	IC	PE5547A
IC 301	(A,27,14)	IC	BA5839FP
Q 101	(B,56,72)	Transistor	2SA1577
Q 102	(B,47,57)	Transistor	2SB1689
X 201	(A,23,35)	Ceramic Resonator 16.934 MHz	CSS1603
S 901	(A,53,37)	Switch(HOME)	CSN1067
S 903	(B,19,58)	Switch(DSCSNS)	CSN1067
S 904	(B,38,67)	Switch(12EJ)	CSN1068
S 905	(B,24,68)	Switch(8EJ)	CSN1068

RESISTORS

R 101	(B,60,73)	RS1/10SR2R4J
R 102	(B,59,71)	RS1/10SR2R4J
R 103	(B,60,71)	RS1/10SR2R7J
R 104	(B,52,69)	RS1/16SS222J
R 105	(B,41,57)	RS1/16SS102J
R 107	(B,41,59)	RS1/16SS105J
R 202	(B,32,62)	RS1/16SS473J
R 203	(B,42,45)	RS1/16S473J
R 204	(A,25,61)	RS1/16SS221J
R 206	(B,26,53)	RS1/16SS104J
R 210	(B,13,32)	RS1/16SS102J
R 214	(B,36,34)	RS1/16SS472J
R 216	(B,47,49)	RS1/16SS472J
R 221	(B,36,32)	RS1/16SS103J
R 222	(B,35,32)	RS1/16SS103J
R 225	(A,49,49)	RS1/16SS103J
R 226	(A,49,50)	RS1/16SS393J
R 227	(B,45,51)	RS1/16SS562J
R 228	(B,42,53)	RS1/16SS122J
R 229	(B,44,53)	RS1/16SS472J
R 230	(B,21,28)	RS1/16SS0R0J
R 232	(B,43,51)	RS1/16SS122J
R 233	(B,29,52)	RS1/16SS103J
R 234	(B,30,61)	RS1/16SS473J
R 235	(A,25,63)	RS1/16SS473J
R 239	(B,26,48)	RS1/16SS473J
R 240	(B,10,31)	RS1/16SS473J
R 241	(B,9,32)	RS1/16SS103J
R 244	(A,20,52)	RS1/16SS473J
R 255	(A,27,63)	RAB4CQ104J
R 307	(A,34,19)	RS1/16SS183J
R 308	(A,38,20)	RS1/16SS183J
R 309	(A,35,21)	RS1/16SS183J
R 310	(A,38,21)	RS1/16SS183J
R 601	(B,28,38)	RS1/16SS0R0J
R 602	(B,27,41)	RS1/16SS0R0J
R 606	(B,23,41)	RS1/16SS0R0J
R 701	(B,16,35)	RS1/16SS221J
R 702	(A,23,55)	RS1/16SS221J

CAPACITORS

C 106	(B,56,69)	CKSQYB475K6R3
C 202	(A,27,57)	CKSSYB104K10
C 204	(A,24,63)	CKSSYB103K16
C 205	(B,23,43)	CKSQYB475K6R3
C 206	(A,22,39)	CKSSYB104K10
C 207	(A,24,37)	CKSRYB104K16
C 209	(B,33,40)	CEVW220M6R3
C 210	(B,29,42)	CKSSYB104K10
C 211	(A,27,34)	CKSSYB104K10
C 212	(B,29,32)	CKSRYB104K16
C 213	(A,44,37)	CKSSYB104K10
C 214	(A,28,33)	CKSSYB104K10
C 216	(A,50,51)	CKSSYB332K50
C 217	(A,46,51)	CKSSYB104K10
C 218	(A,49,51)	CKSSYB473K10
C 219	(A,45,53)	CKSSYB104K10
C 220	(A,46,53)	CKSSYB182K50
C 221	(A,44,53)	CKSSYB104K10
C 222	(B,43,53)	CCSSCH560J50
C 223	(B,45,53)	CCSSCH4R0C50
C 224	(A,43,55)	CKSSYB104K10
C 226	(A,40,58)	CCSSCH680J50
C 227	(A,40,60)	CCSSCH470J50
C 228	(A,39,62)	CKSSYB103K16

Circuit Symbol and No.		Part No.
C 229	(B,49,59)	CKSSYB104K10
C 236	(A,42,61)	CKSSYB104K10
C 239	(B,44,51)	CCSSCH220J50
C 240	(A,35,61)	CKSSYB104K10
C 250	(B,36,30)	CKSSYB102K50
C 251	(B,33,29)	CKSSYB102K50
C 303	(A,35,19)	CKSSYB472K25
C 304	(A,34,21)	CKSSYB223K16
C 307	(B,25,9)	CKSRYB104K16
C 308	(B,10,27)	CKSRYB105K10
C 703	(B,11,37)	CCSSCH101J50
C 704	(B,8,36)	CKSSYB102K50
C 711	(A,25,26)	CKSSYB104K10

D

Unit Number : CWS1389
Unit Name : Switch Unit

S 1	(B,7,14)	Switch(OPEN)	CSN1051
S 2	(B,29,12)	Spring Switch(CLOSE)	CSN1052

Miscellaneous Parts List

	Pickup Unit(P10.5)(Service)	CXX1942
M 1	Motor Unit(SPINDLE)	CXC7134
M 2	Motor Unit(LOADING/CARRIAGE)	CXC4026
M 3	Motor Unit(FLAP)	XXA7400

6. ADJUSTMENT
6.1 CD ADJUSTMENT

1) Cautions on adjustments

• In this product the single voltage (3.3 V) is used for the regulator. The reference voltage is the REFO1 (1.65 V) instead of the GND.
If you should mistakenly short the REFO1 with the GND during adjustment, accurate voltage will not be obtained, and the servo's misoperation will apply excessive shock to the pickup. To avoid such problems:
a. Do not mix up the REFO1 with the GND when connecting the (-) probe of measuring instruments. Especially on an oscilloscope, avoid connecting the (-) probe for CH1 to the GND.
b. In many cases, measuring instruments have the same potential as that for the (-) probe. Be sure to set the measuring instruments to the floating state.
c. If you have mistakenly connected the REFO1 to the GND, turn off the regulator or the power immediately.

• Before mounting and removing filters or leads for adjustment, be sure to turn off the regulator.

• For stable circuit operation, keep the mechanism operating for about one minute or more after the regulator is turned on.

• In the test mode, any software protections will not work. Avoid applying any mechanical or electrical shock to the mechanism during adjustment.

• The RFI and RFO signals with a wide frequency range are easy to oscillate. When observing the signals, insert a resistor of 1k ohms in series.

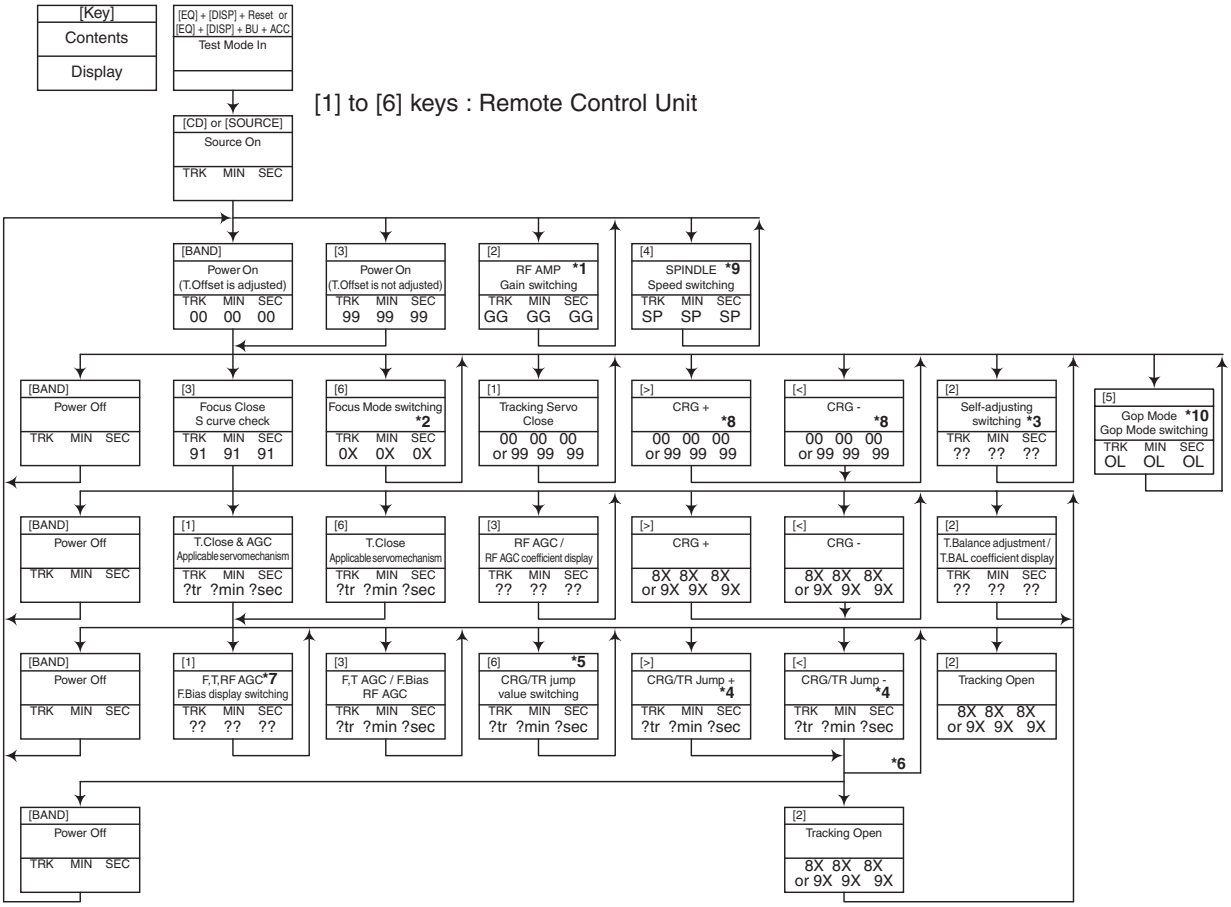
• The load and eject operation is not guarantied with the mechanism upside down. If the mechanism is blocked due to mistaken eject operation, reset the product or turn off and on the ACC to restore it.

2) Test mode

This mode is used to adjust the CD mechanism module.
• To enter the test mode.
While pressing the [EQ] and [DISP] keys at the same time, reset.
• To exit from the test mode.
Turn off the ACC and back up.

Notes:
a. During ejection, do not press any other keys than the EJECT key until the loaded disc is ejected.
b. If you have pressed the [→] key or [←] key during focus search, turn off the power immediately to protect the actuator from damage caused by the lens stuck.
c. For the TR jump modes except 100TR, the track jump operation will continue even if the key is released.
d. For the CRG move and 100TR jump modes, the tracking loop will be closed at the same time when the key is released.
e. When the power is turned off and on, the jump mode is reset to the single TR (91), the RF amp gain is set to 0 dB, and the auto-adjustment values are reset to the default settings.

● Flow Chart


[Key]
Contents
Display
[EQ] + [DISP] + Reset or [EQ] + [DISP] + BU + ACC
Test Mode In
[CD] or [SOURCE]
Source On
TRK MIN SEC
[1] to [6] keys : Remote Control Unit
[BAND] Power On (T.Offset is adjusted) TRK MIN SEC 00 00 00
[3] Power On (T.Offset is not adjusted) TRK MIN SEC 99 99 99
[2] RF AMP *1 Gain switching TRK MIN SEC GG GG GG
[4] SPINDLE *9 Speed switching TRK MIN SEC SP SP SP
[BAND] Power Off
[3] Focus Close S curve check TRK MIN SEC 91 91 91
[6] Focus Mode switching *2 TRK MIN SEC 0X 0X 0X
[1] Tracking Servo Close 00 00 00 or 99 99 99
[>] CRG + *8 00 00 00 or 99 99 99
[<] CRG - *8 00 00 00 or 99 99 99
[2] Self-adjusting switching *3 TRK MIN SEC ?? ?? ??
[5] Gop Mode *10 Gop Mode switching TRK MIN SEC OL OL OL
[1] T.Close & AGC Applicable servomechanism TRK MIN SEC ?tr ?min ?sec
[6] T.Close Applicable servomechanism TRK MIN SEC ?tr ?min ?sec
[3] RF AGC / RF AGC coefficient display TRK MIN SEC ?? ?? ??
[>] CRG + 8X 8X 8X or 9X 9X 9X
[<] CRG - 8X 8X 8X or 9X 9X 9X
[2] T.Balance adjustment / T.BAL coefficient display TRK MIN SEC ?? ?? ??
[1] F,T,RF AGC*7 F.Bias display switching TRK MIN SEC ?? ?? ??
[3] F,T AGC / F.Bias RF AGC TRK MIN SEC ?tr ?min ?sec
[6] *5 CRG/TR jump value switching TRK MIN SEC ?tr ?min ?sec
[>] CRG/TR Jump + *4 TRK MIN SEC ?tr ?min ?sec
[<] CRG/TR Jump - *4 TRK MIN SEC ?tr ?min ?sec
[2] Tracking Open 8X 8X 8X or 9X 9X 9X
*6
[2] Tracking Open 8X 8X 8X or 9X 9X 9X

*1) TYP (TRK MIN SEC) → + 6 dB ($^{TRK}06^{MIN}06^{SEC}06$) → + 12 dB ($^{TRK}12^{MIN}12^{SEC}12$)

*2) Focus Close → S Curve check setting → F EQ measurement setting
$^{TRK}00^{MIN}00^{SEC}00$ ($^{TRK}99^{MIN}99^{SEC}99$) $^{TRK}01^{MIN}01^{SEC}01$ $^{TRK}02^{MIN}02^{SEC}02$

*3) F.Offset Display → RF.Offset → T.Offset Display → Switch to the order of the original display

*4) 1TR/4TR/10TR/32TR/100TR

*5) Single → 4TR → 10TR → 32TR → 100TR → CRG Move
9x(8x):91(81) 92(82) 93(83) 94(84) 95(85) 96(86)

*6) Only at the time of CRG move, 100TR jump

*7) TRK/MIN/SEC → F.AGC → T.AGC Gain → F.Bias → RF AGC

*8) CRG motor voltage = 2 [V]

[Key]	Operation Test Mode
[BAND]	Power On/Off
[>]	CRG + / TR Jump + (Direction of the external surface)
[<]	CRG - / TR Jump - (Direction of the internal surface)
[1]	T. CLS & AGC & Applicable servomechanism / AGC,AGC display setting
[2]	RF Gain switching / Offset adjustment display / T.Balance adjustment / T. Open
[3]	F. Close,S Curve / Rough Servo and RF AGC / F,T,RF AGC
[4]	SPDL 1X/2X switching As for the double speed(2x), audio output cannot be supported.
[5]	Error Rate measurement ON : ERR 30 Counts Start BER display data[%]
[6]	F. Mode switching / Tracking Close / CRG • TR Jump Switching

*9) TYP (1X) (TRK MIN SEC) → 2X ($^{TRK}22^{MIN}22^{SEC}22$) → 1X ($^{TRK}11^{MIN}11^{SEC}11$)

*10) OFF(TYP) (TRK MIN SEC) → FORCUS ($^{TRK}70^{MIN}70^{SEC}70$) → TRACKING ($^{TRK}71^{MIN}71^{SEC}71$)

• As for the double speed (2x), audio output cannot be supported

*) • After the [EJECT] key is pressed keys other than the [EJECT] key should not be pressed, until disc ejection is complete.
• When the key [2] or [3] is pressed during the Focus Search, the power supply should be immediately turned off (otherwise the lens sticks to Wall, causing the actuator to be damaged).
• In the case of TR jump other than to 100TR, the function shall continue to be processed even if the TR jump key is released. As for the CRG Move and 100TR Jump, the mechanism shall be set to the Tracking Close mode when the key is released.
• When the power is turned on/off the jump mode is reset to the Single TR (91) while the gain of the RFAMP is reset to 0 dB. At the same time all the self-adjusting values shall return to the default setting.

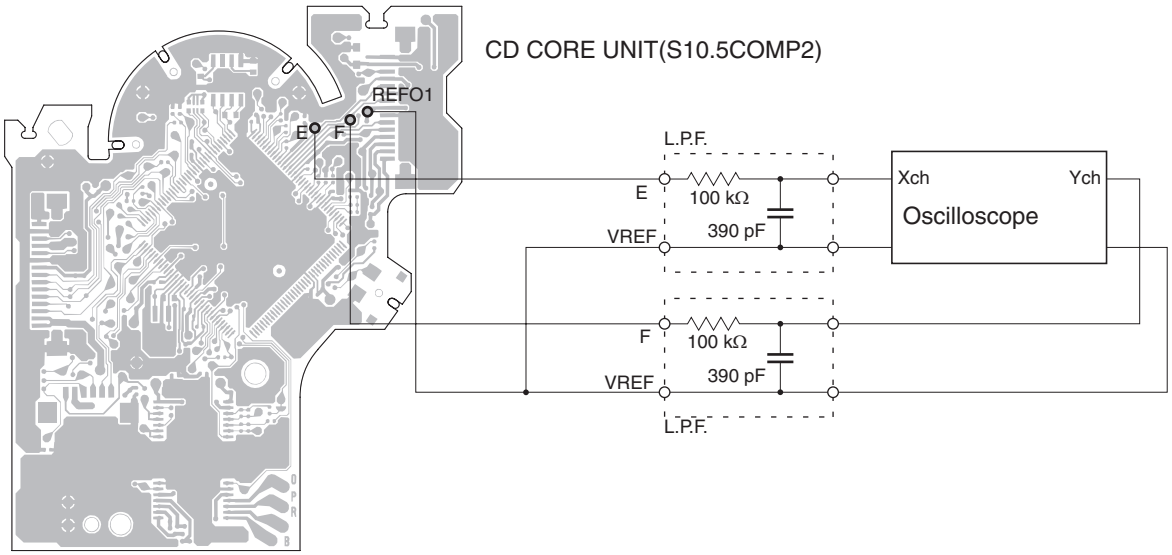
6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

- **Note :**
  The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

- **Purpose :**
  To check that the grating is within an acceptable range when the PU unit is changed.

- **Symptoms of Mal-adjustment :**
  If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

- Method :
- Measuring Equipment • Oscilloscope, Two L.P.F.
- Measuring Points • E, F, REFO1
- Disc • TCD-782
- Mode • TEST MODE



- **Checking Procedure**

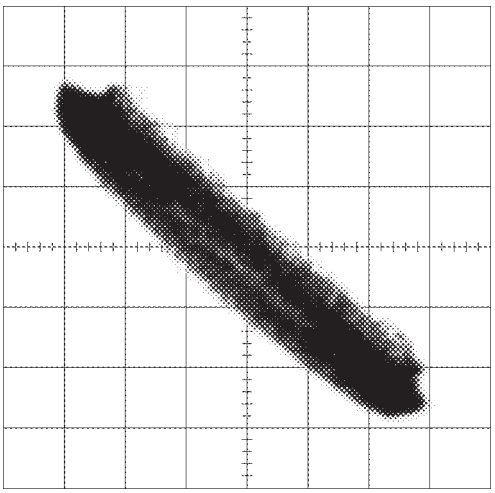
1. In test mode, load the disc and switch the 3 V regulator on.
2. Using the [→] and [←] buttons, move the PU unit to the innermost track.
3. Press key [3] to close focus, the display should read "91". Press key [2] to implement the tracking balance adjustment the display should now read "81". Press key [3]. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75°. Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75 then the mechanism should be judged to be at fault.

- **Note**
  Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.
- **Hint**
  Reloading the disc changes the clamp position and may decrease the "wobble".

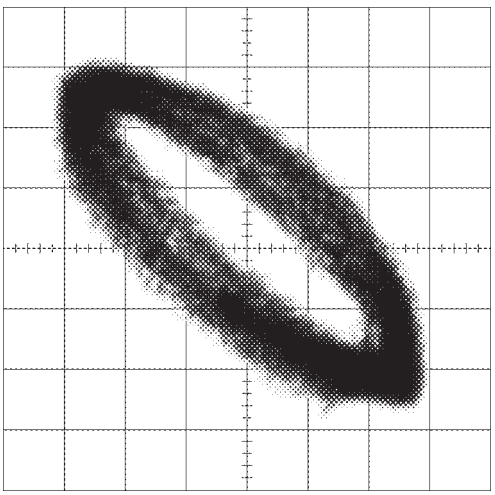
Grating waveform

Ech → Xch 20 mV/div, AC
Fch → Ych 20 mV/div, AC

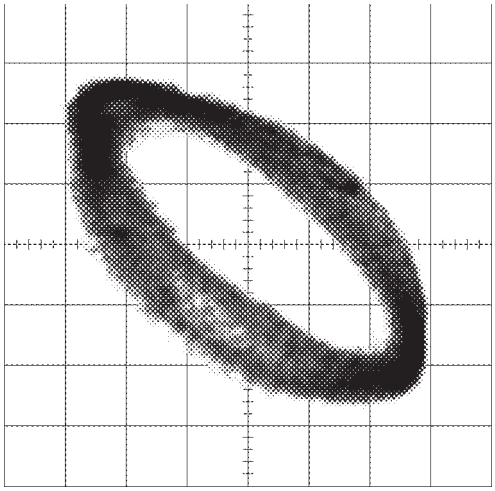
0°



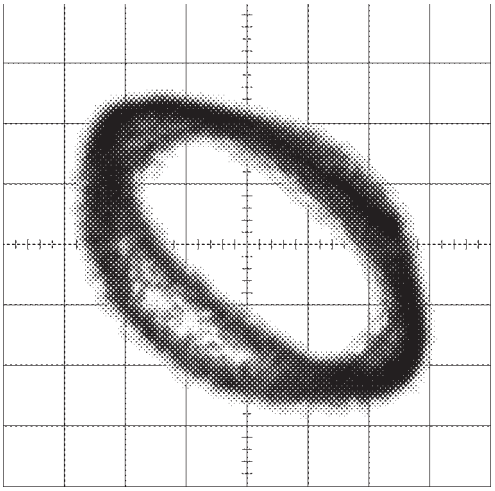
30°



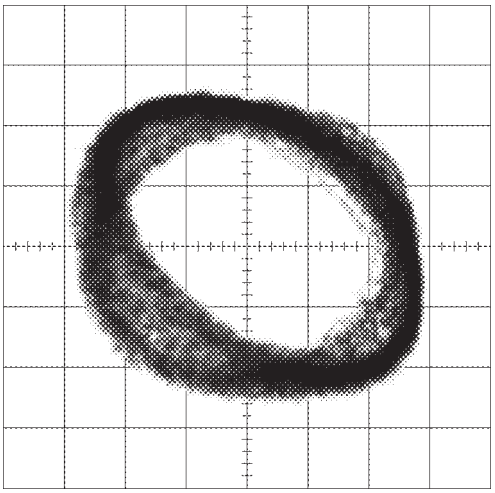
45°



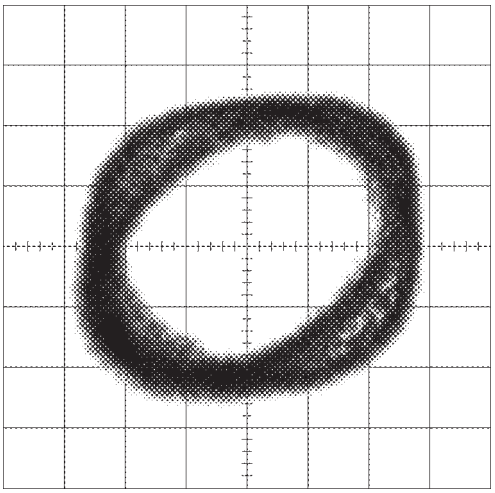
60°



75°



90°



6.3 ERROR MODE

● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

8-digit display	6-digit display	4-digit display
ERROR - xx	ERR - xx	E - xx

(2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG SERVO LSI Communication Error	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism. Communication error between microcomputer and SERVO LSI.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG Subcode NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations. A disc not containing CD-R data is found. Turned over disc are found, though rarely. CD signal error.
17	Electricity	Setup NG	AGC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations on REWRITABLE.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
44	Electricity	ALL Skip	Skip setting for all track. (CD-R/RW)
50	Mechanism	CD On Mech Error	Mechanical error during CD ON. → Defective loading motor, mechanical lock and mechanical sensor.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).

Unreadable TOC does not constitute an error. An intended operation continues in this case.

Upper digits of an error code are subdivided as shown below:

1x: Setup relevant errors, 3x: Search relevant errors, Ax: Other errors.

6.4 SYSTEM MICROCOMPUTER TEST PROGRAM

● PCL Output

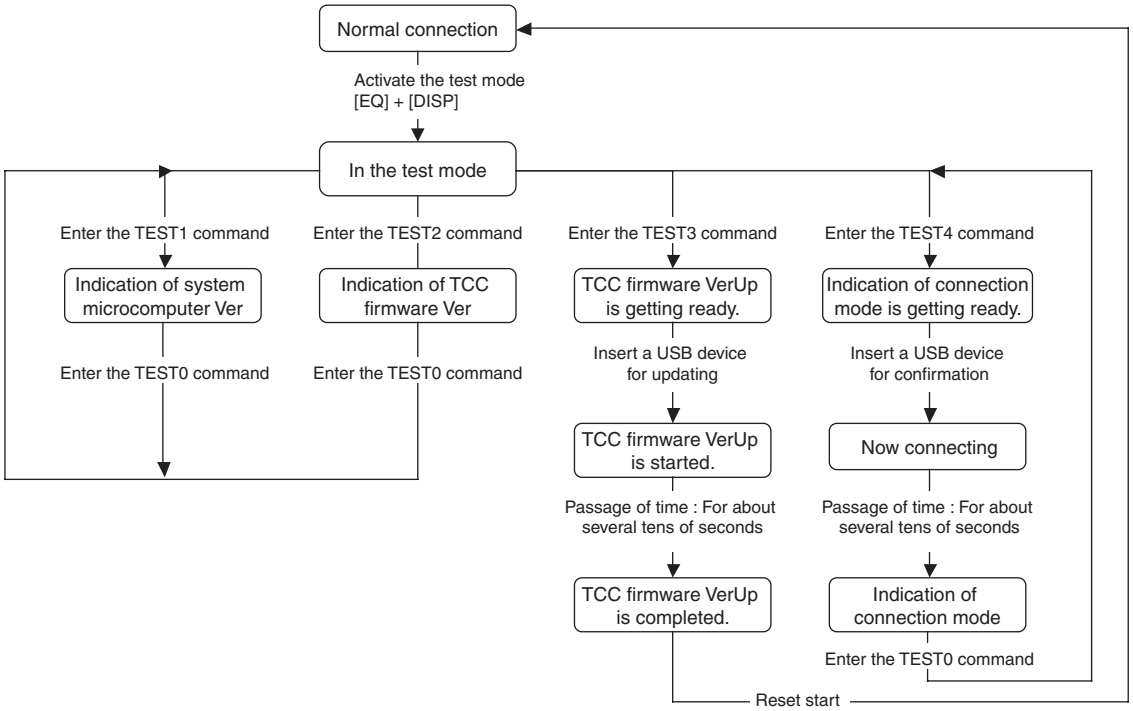
In the normal operation mode (with the detachable panel installed, the ACC switched ON, the standby mode cancelled), shift the TEST1 IC601(Pin 86) terminal to H.
The clock signal is output from the PCL1 terminal IC601(Pin 37).
The frequency of the clock signal is 468.750 kHz that is one 32th of the fundamental frequency.
The clock signal should be 468.750 kHz ± 19 Hz.
If the clock signal is out of the range, the X'tal (X601) should be replaced with new one.

6.5 TEST MODE

● Implemented functions

TEST1 command	Right key
TEST2 command	Left key
TEST3 command	LIST key
TEST4 command	DISP key
TEST0 command	BAND/ESC key

- Indication of system microcomputer Ver
- Indication of TCC firmware Ver
- To enter the TCC firmware UpDate mode:
  →Set this mode and insert a USB device having the UpDate program to start rewriting the device.
  * If you carry out the TEST 3 command with the USB device inserted, a correct result is not displayed.
- Confirmation on connection mode (mass storage class connection)
  →Set this mode and insert a USB device. Then, the connection mode is displayed.
  * Do not insert a USB device having the UpDate program.
  * If you carry out the TEST 4 command with the USB device inserted, a correct result is not displayed. Be sure to insert a USB device when "DeviceIn" is being displayed.


Normal connection
Activate the test mode
[EQ] + [DISP]
In the test mode
Enter the TEST1 command
Enter the TEST2 command
Enter the TEST3 command
Enter the TEST4 command
Indication of system microcomputer Ver
Indication of TCC firmware Ver
TCC firmware VerUp is getting ready.
Indication of connection mode is getting ready.
Enter the TEST0 command
Enter the TEST0 command
Insert a USB device for updating
Insert a USB device for confirmation
TCC firmware VerUp is started.
Now connecting
Passage of time : For about several tens of seconds
Passage of time : For about several tens of seconds
TCC firmware VerUp is completed.
Indication of connection mode
Enter the TEST0 command
Reset start

● Indications

Indication of system microcomputer Ver
Indication of TCC firmware Ver

V e r * . * *
V e r * . * *

TCC firmware VerUp is getting ready.
TCC firmware VerUp is started.
TCC firmware VerUp is completed.

MIN SEC SEC	
R E A D Y 0 0 0	Displays 0:00 to 3:00 (in increments of minutes and seconds)
U P D T 0 0 0	Displays 0:00 to 3:00 (in increments of minutes and seconds)
C O M P L E T E	* The time increment stops when it reaches 3:00.

Confirmation on connection mode is getting ready.
Now connecting
Indication of connection mode

D e v i c e I n	
C o n n e c t	
M S C	When a device supporting mass storage class is connected:
H I D	When iPod is connected:

7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 DISASSEMBLY

● **Removing the Case (not shown)**

1. Remove the two screws and then remove the Case.

● **Removing the CD Mechanism Module (Fig.1)**

1 Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module.

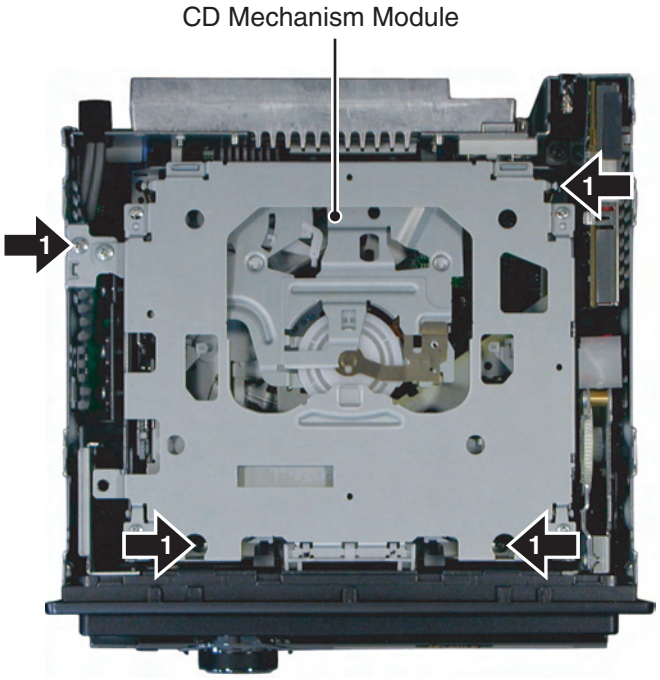


Fig.1

● **Removing the Grille Assy (Fig.2)**

1 Remove the four screws.

Disconnect the connector and then remove the Grille Assy.

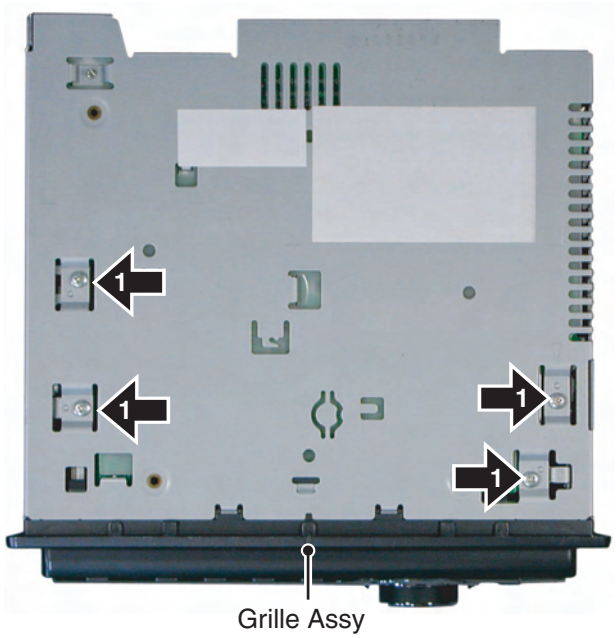


Fig.2

● Removing the Tuner Amp Unit (Fig.3)

1. Remove the screw.
2. Remove the screw.
3. Straighten the tabs at three locations indicated.
4. Remove the screw and then remove the Tuner Amp Unit.

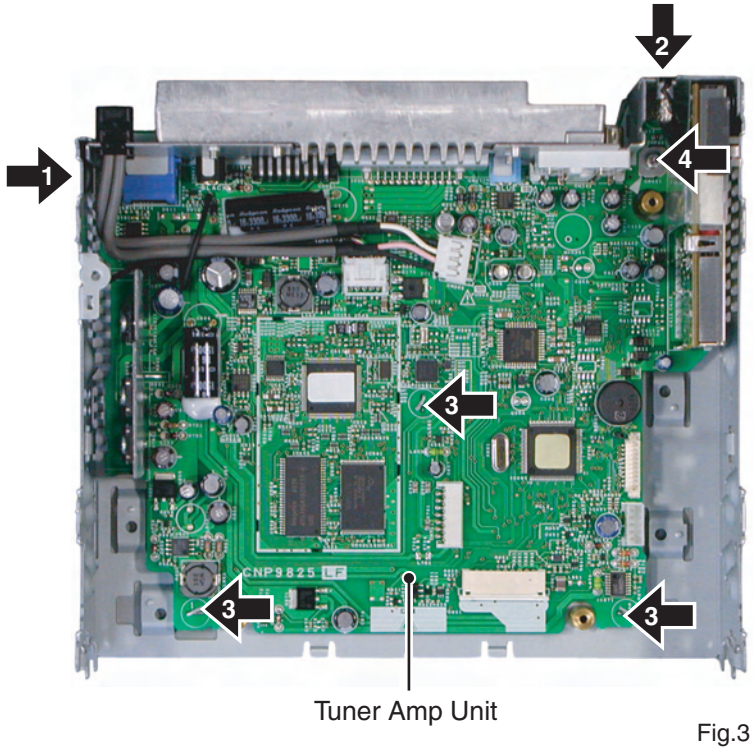
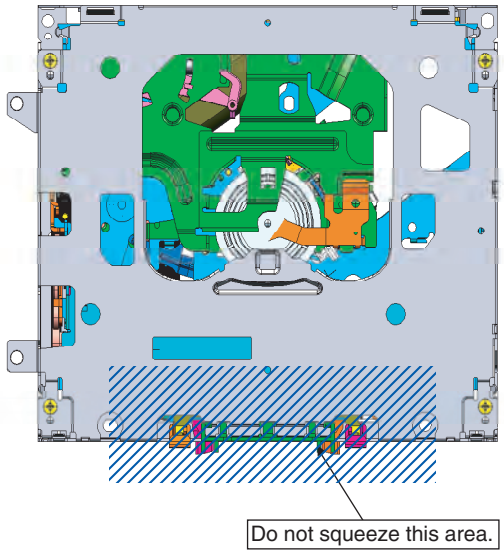


Fig.3

● How to hold the Mechanism Unit

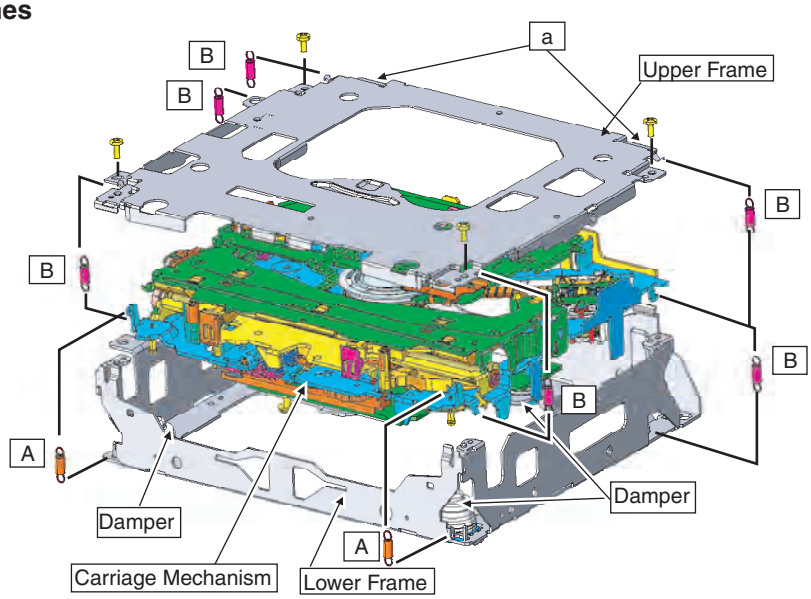
1. Hold the Upper and Lower Frames.
2. Do not hold the front portion of the Upper Frame, because it is not very solid.



● Removing the Upper and Lower Frames

1. With a disc inserted and clamped in the mechanism, remove the two Springs (A), the six Springs (B), and the four Screws.
2. Turn the Upper Frame using the part "a" as a pivot, and remove the Upper Frame.
3. While lifting the Carriage Mechanism, remove it from the three Dampers.

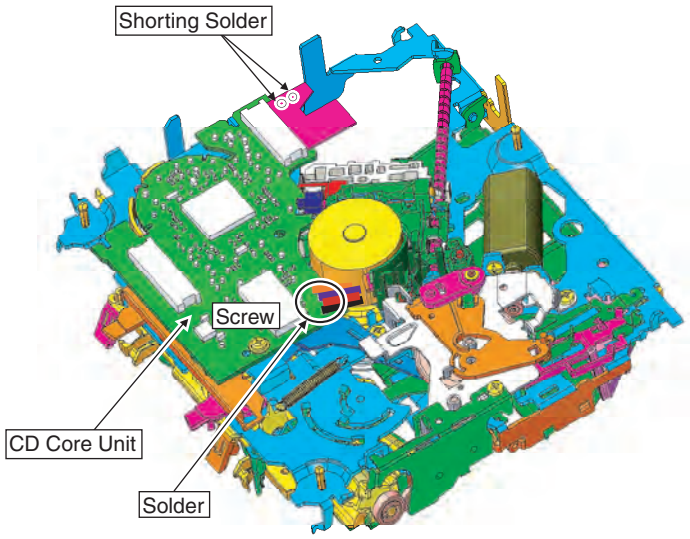
Caution: When assembling, be sure to apply some alcohol to the Dampers and assemble the mechanism in a clamped state.



● How to remove the CD Core Unit

1. Apply Shorting Solder to the flexible cable of the Pickup, and disconnect it from the connector.
2. Unsolder the four leads, and loosen the Screw.
3. Remove the CD Core Unit.

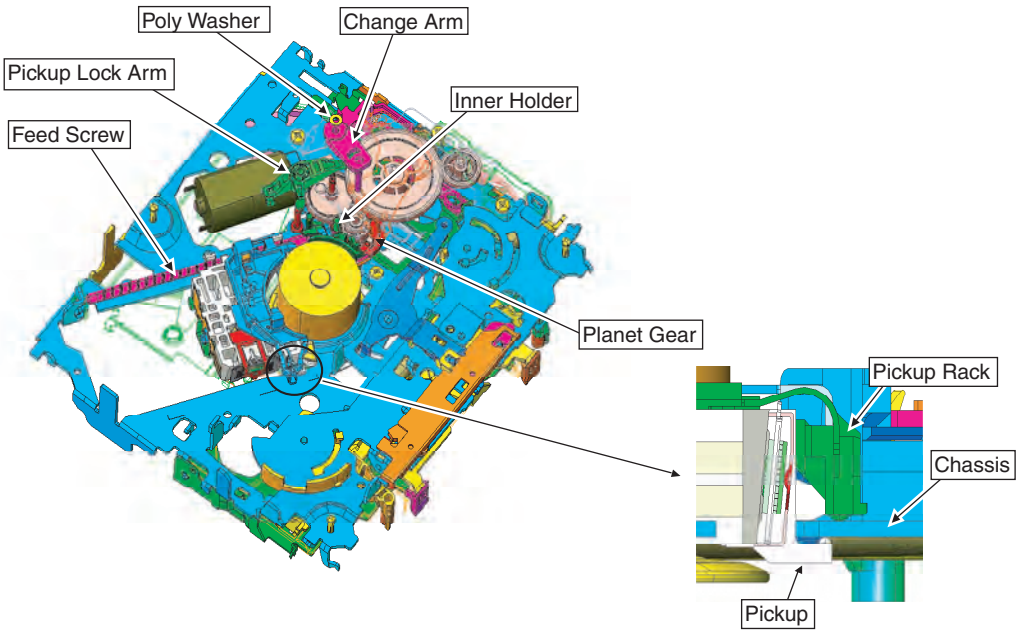
Caution: When assembling the CD Core Unit, assemble it with the SW in a clamped state so as not to damage it.



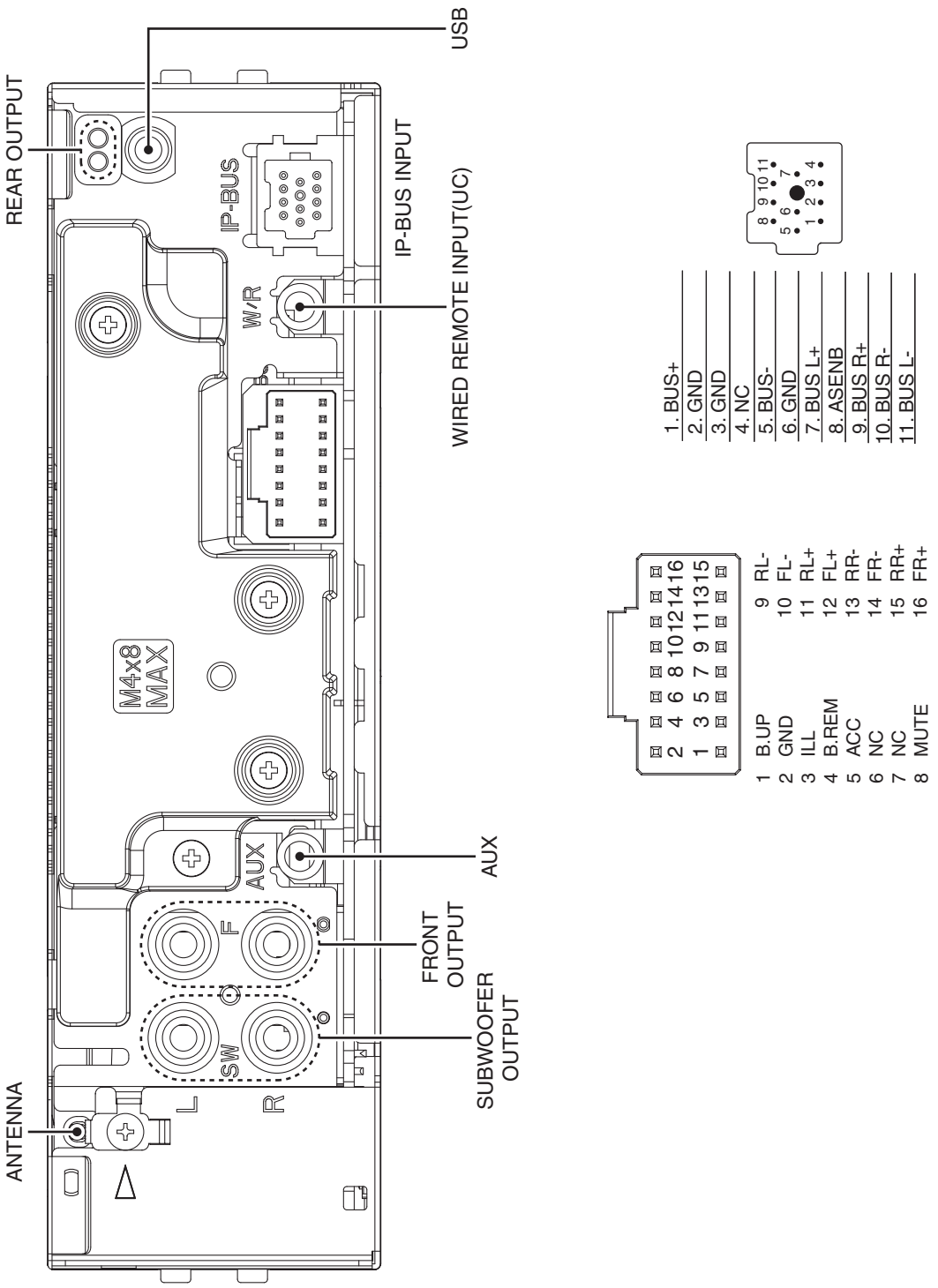
● How to remove the Pickup Unit

1. Make the system in the carriage mechanism mode, and have it clamped.
2. Remove the CD Core Unit and remove the leads from the Inner Holder.
3. Remove the Poly Washer, Change Arm, and Pickup Lock Arm.
4. While releasing from the hook of the Inner Holder, lift the end of the Feed Screw.

Caution: When assembling, move the Planet Gear to the load/eject position before setting the Feed Screw in the Inner Holder.
Assemble the sub unit side of the Pickup, taking the plate (Chassis) in-between. When treating the leads of the Load Carriage Motor Assy, do not make them loose over the Feed Screw.



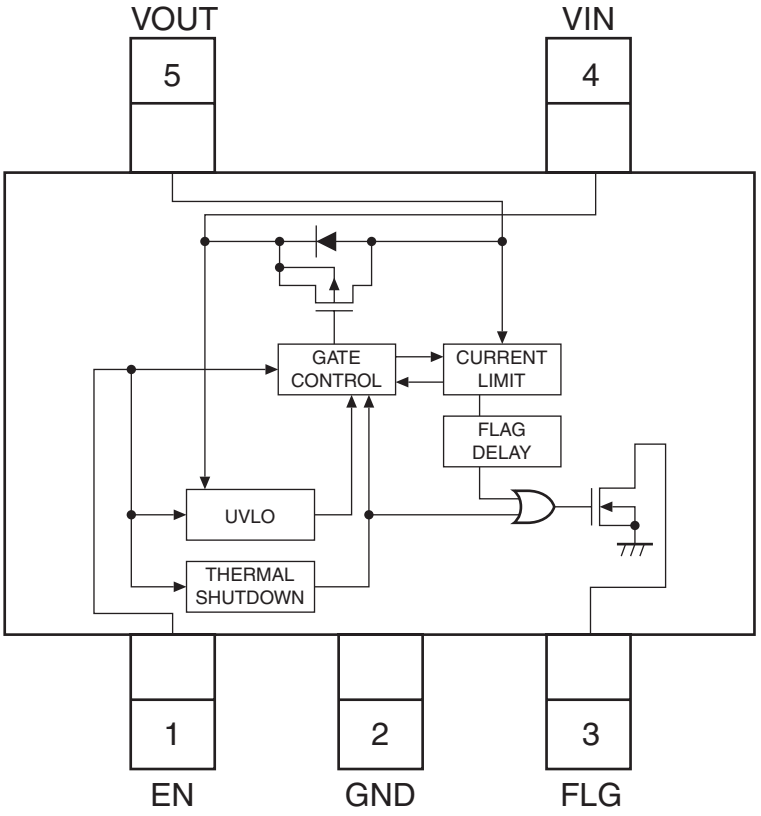
7.1.2 CONNECTOR FUNCTION DESCRIPTION



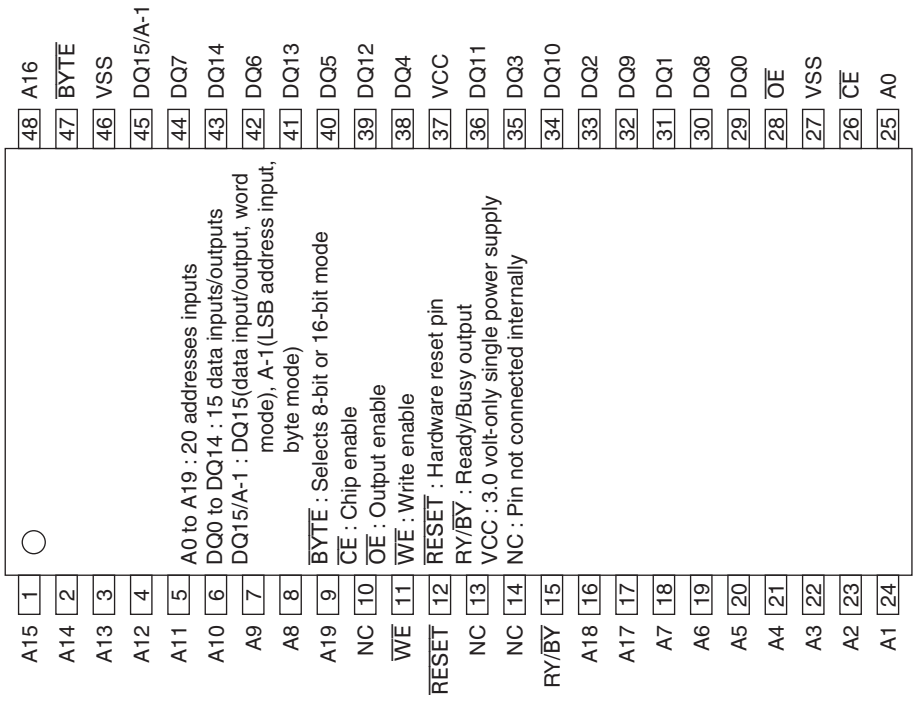
7.2 IC

R5523N001B	TCC8600-00X-EA-AG	NJM2872BF18	PD8174A
PEH084A	PML016B	NJM2872BF05	PD8173A
LT1766EFE-5	AK4388VT	HY57V641620ETP-H	
PAL007C	341S2025	PE5547A	
TC4066BFT	PEG301A	PEG312A8	

R5523N001B

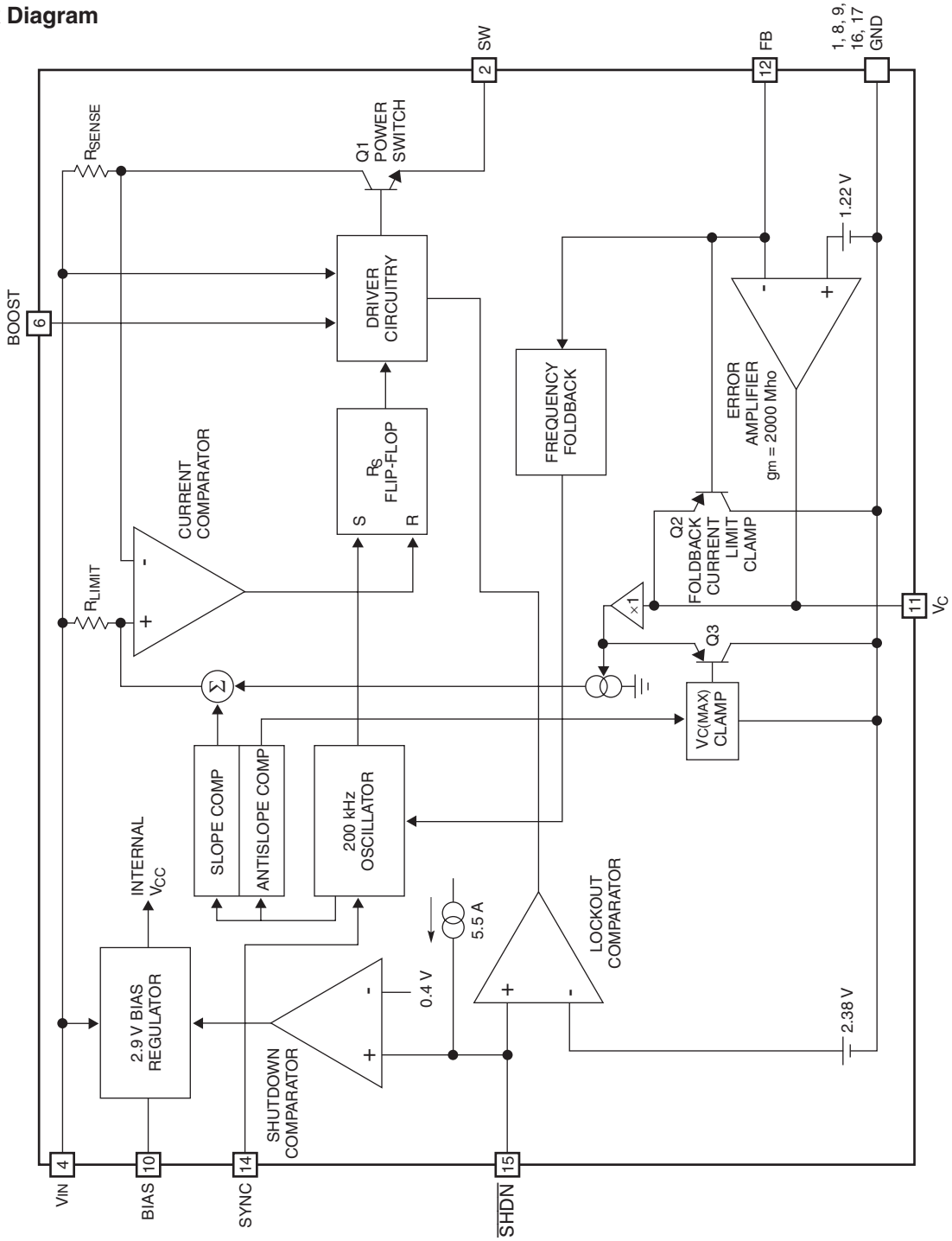


PEH084A

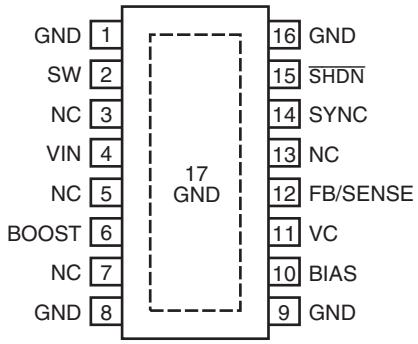


LT1766EFE-5

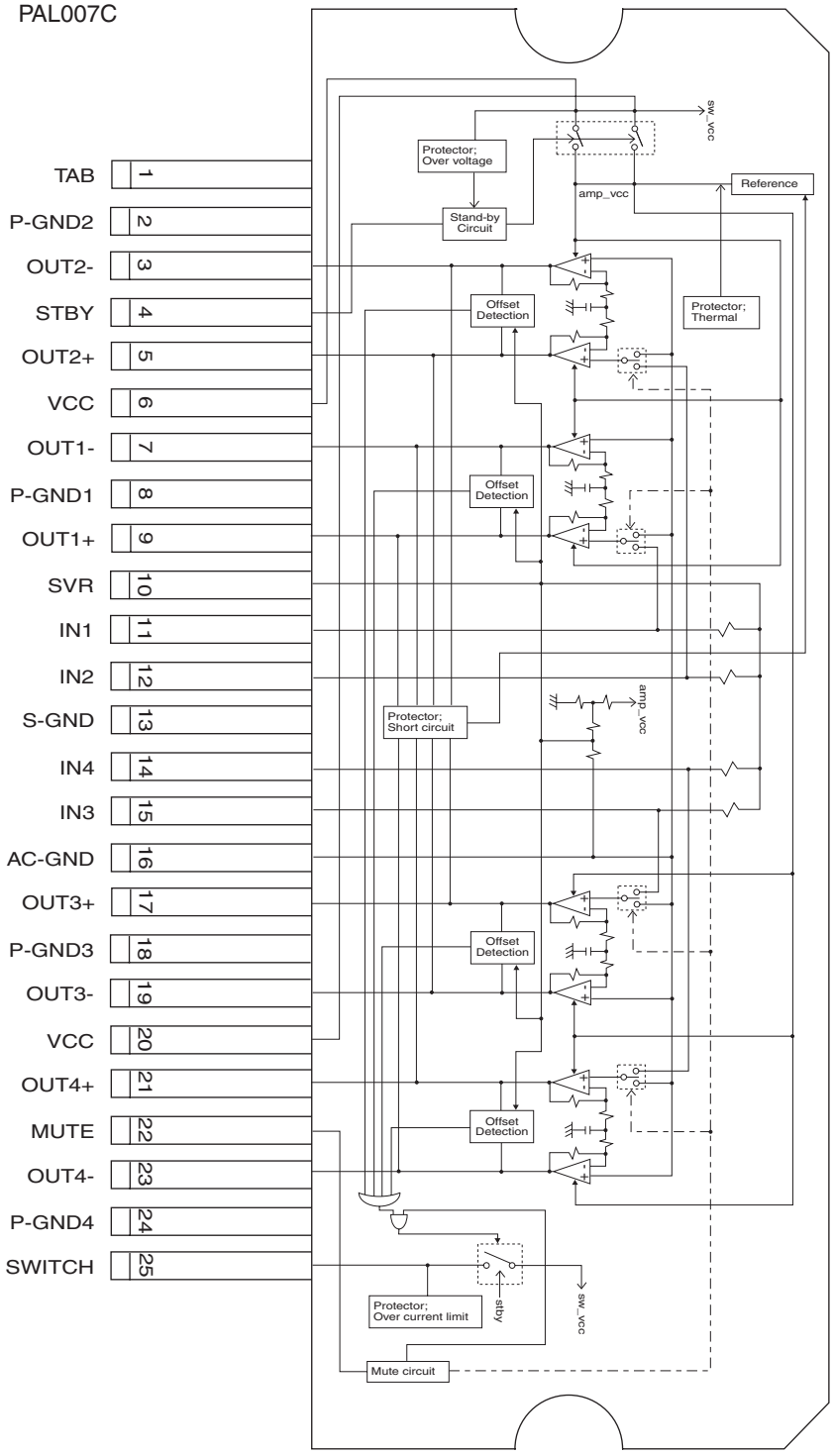
● Block Diagram



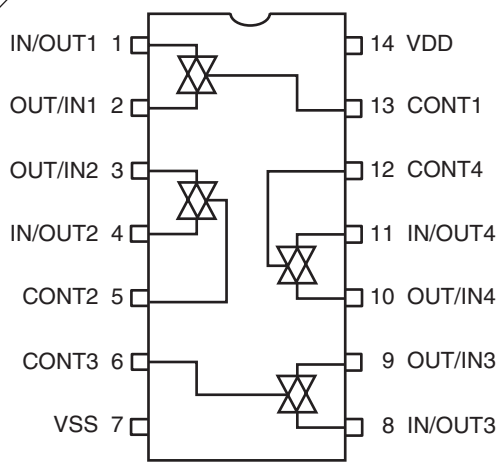
● Pin Layout



PAL007C



TC4066BFT

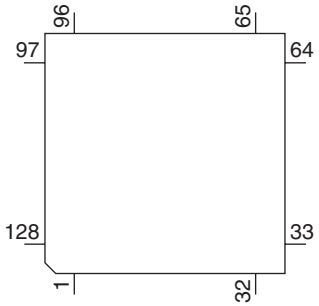


● Pin Functions(TCC8600-00X-EA-AG)

Pin No.	Pin Name	I/O	Function and Operation
1	VSS		Digital ground
2-6	XD[4]-[8]	I/O	External bus data bit [4]-[8]. Internal pull-up resistor enabled at reset.
7	VDDI		Digital power for internal core (1.8 V)
8	VSS		Digital ground
9	VDDIO		Digital power for I/O (3.3 V)
10-16	XD[9]-[15]	I/O	External bus data bit [9]-[15]. Internal pull-up resistor enabled at reset.
17-23	XA[0]-[6]	I/O	External bus address bit [0]-[6]
24	VDDI		Digital power for internal core (1.8 V)
25	VSS		Digital ground
26	VDDIO		Digital power for I/O (3.3 V)
27-39	XA[7]-[19]	I/O	External bus address bit [7]-[19]
40	VDDI		Digital power for internal core (1.8 V)
41,42	XA[20], [21]	I/O	External bus address bit [20], [21]
43	VDDIO		Digital power for I/O (3.3 V)
44	SD_CLK	I/O	SDRAM clock
45	VSS		Digital ground
46	SD_CKE	I/O	SDRAM clock enable signal. Active high.
47	SD_nCS	I/O	Chip select signal for SDRAM, active low
48	nWE	I/O	Static memory write enable signal. Active low.
49	nOE	I/O	Static memory output enable signal. Active low.
50	nCS[0]/ND_nOE[0]	I/O	External bus chip select [0] / NAND flash output enable [0]
51	nCS[1]/ND_nOE[1]	I/O	External bus chip select [1] / NAND flash output enable [1]
52	nCS[2]/ND_nOE[2]	I/O	External bus chip select [2] / NAND flash output enable [2]
53	nCS[3]/ND_nOE[3]	I/O	External bus chip select [3] / NAND flash output enable [3]
54	XOUT	O	12 MHz crystal oscillator output
55	XIN	I	12 MHz crystal oscillator input. Voltage must not exceed VDDI (1.95 V).
56	XTOUT	O	32.768 kHz crystal oscillator output
57	XTIN	I	32.768 kHz crystal oscillator input. Voltage must not exceed VDDI (1.95 V).
58	VDDI		Digital power for internal core (1.8 V)
59	VSS		Digital ground
60	GPIO_B[6]	I/O	GPIO_B[6]
61	ND_nWE	I/O	NAND flash WE. Active low
62	UART0TXD	I/O	UART0 TX data
63	UART0RXD	I/O	UART0 RX data
64	READY	I	Ready information from external device.
65	VDDIO		Digital power for I/O (3.3 V)
66	ADIN4		General purpose multi-channel ADC input 4
67	ADIN2		General purpose multi-channel ADC input 2
68	ADIN0		General purpose multi-channel ADC input 0
69	VDDADC		Analog power for ADC (3.3 V)
70	VSSADC		Analog ground for ADC
71	VSSPLL1		Analog ground for PLL
72	XFILT1		PLL1 filter output. 1 200 pF capacitor is required.
73	VDDPLL1		Analog & digital power for PLL1 (1.8 V)
74	VDDPLL		Analog & digital power for PLL (1.8 V)
75	XFILT		PLL0 filter output. 350 pF capacitor is required.
76	VSSPLL		Analog ground for PLL
77	nRESET	I	System Reset. Active low.
78	MODE1	I	Mode setting input 1. Pull-down for normal operation.
79	USBH0_DN	I/O	USB host port 0 D- signal
80	USBH0_DP	I/O	USB host port 0 D+ signal
81	VSS		Digital ground
82	USBH1_DN	I/O	USB host port 1 D- signal
83	USBH1_DP	I/O	USB host port 1 D+ signal
84	VDDUSB		Power for USB I/O (3.3 V)

Pin No.	Pin Name	I/O	Function and Operation
85	VDDIO		Digital power for I/O (3.3 V)
86	BCLK	I/O	I2S bit clock / Boot mode bit 0 (BM[0])
87	LRCK	I/O	I2S word clock / Boot mode bit 1 (BM[1])
88	MCLK	I/O	I2S System Clock
89	DAO	I/O	I2S digital audio data output / Boot mode bit 2 (BM[2])
90	DAI	I/O	I2S digital audio data input
91	VDDI		Digital power for internal core (1.8 V)
92	GPIO_D[15]	I/O	GPIO_D[15]
93	GPIO_D[16]	I/O	GPIO_D[16] / I2C SDA
94	GPIO_D[17]	I/O	GPIO_D[17] / I2C SCL
95,96	GPIO_D[18],[19]	I/O	GPIO_D[18], [19]. Internal pull-up resistor enabled at reset.
97	VSS		Digital ground
98,99	GPIO_D[20],[21]	I/O	GPIO_D[21], [20]. Internal pull-up resistor enabled at reset.
100	TDI	I/O	JTAG serial data input. Internal pull-up resistor is enabled at reset
101	TMS	I/O	JTAG test mode select. Internal pull-up resistor is enabled at reset
102	TCK	I/O	JTAG test clock. Internal pull-up resistor is enabled at reset
103	TDO	I/O	JTAG serial data output. Internal pull-up resistor is enabled at reset
104	nTRST	I/O	JTAG reset signal. Active low. Internal pull-up resistor is enabled at reset
105	GPIO_A[0]	I/O	GPIO_A[0] / GPSB/GSIO1 data output
106	GPIO_A[1]	I/O	GPIO_A[1] / GPSB/GSIO1 clock
107	GPIO_A[2]	I/O	GPIO_A[2] / GPSB/GSIO1 FRM
108	GPIO_A[3]	I/O	GPIO_A[3] / GPSB/GSIO1 data in
109	GPIO_A[4]	I/O	GPIO_A[4] / GPSB/GSIO1 data output
110	VDDI		Digital power for internal core (1.8 V)
111	GPIO_A[5]	I/O	GPIO_A[5] / GPSB/GSIO1 clock
112	GPIO_A[6]	I/O	GPIO_A[6] / GPSB/GSIO1 FRM
113	GPIO_A[7]	I/O	GPIO_A[7] / GPSB/GSIO1 data in
114	GPIO_A[8]	I/O	GPIO_A[8] / I2C data line / GPSB/GSIO3 data output
115	GPIO_A[9]	I/O	GPIO_A[9] / I2C clock./ Bus width (BW) / GPSB/GSIO3 clock
116	GPIO_A[10]	I/O	GPIO_A[10] / I2C data line / GPSB/GSIO3 FRM
117	GPIO_A[11]	I/O	GPIO_A[11] / I2C clock / GPSB/GSIO3 data in
118	VSS		Digital ground
119	VDDIO		Digital power for I/O (3.3 V)
120-123	EXINT[0]-[3]	I/O	External interrupt request [0]-[3]
124	VDDI		Digital power for internal core (1.8 V)
125-128	XD[0]-[3]	I/O	External bus data bit [0]-[3]. Internal pull-up resistor enabled at reset.

TCC8600-00X-EA-AG



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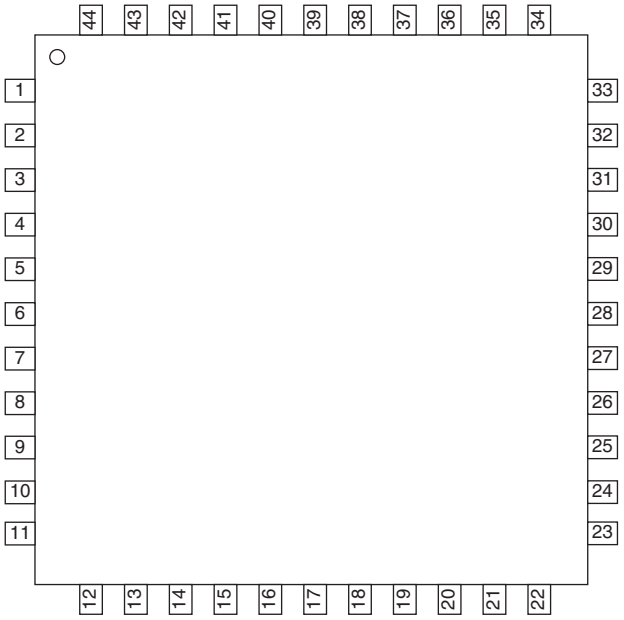
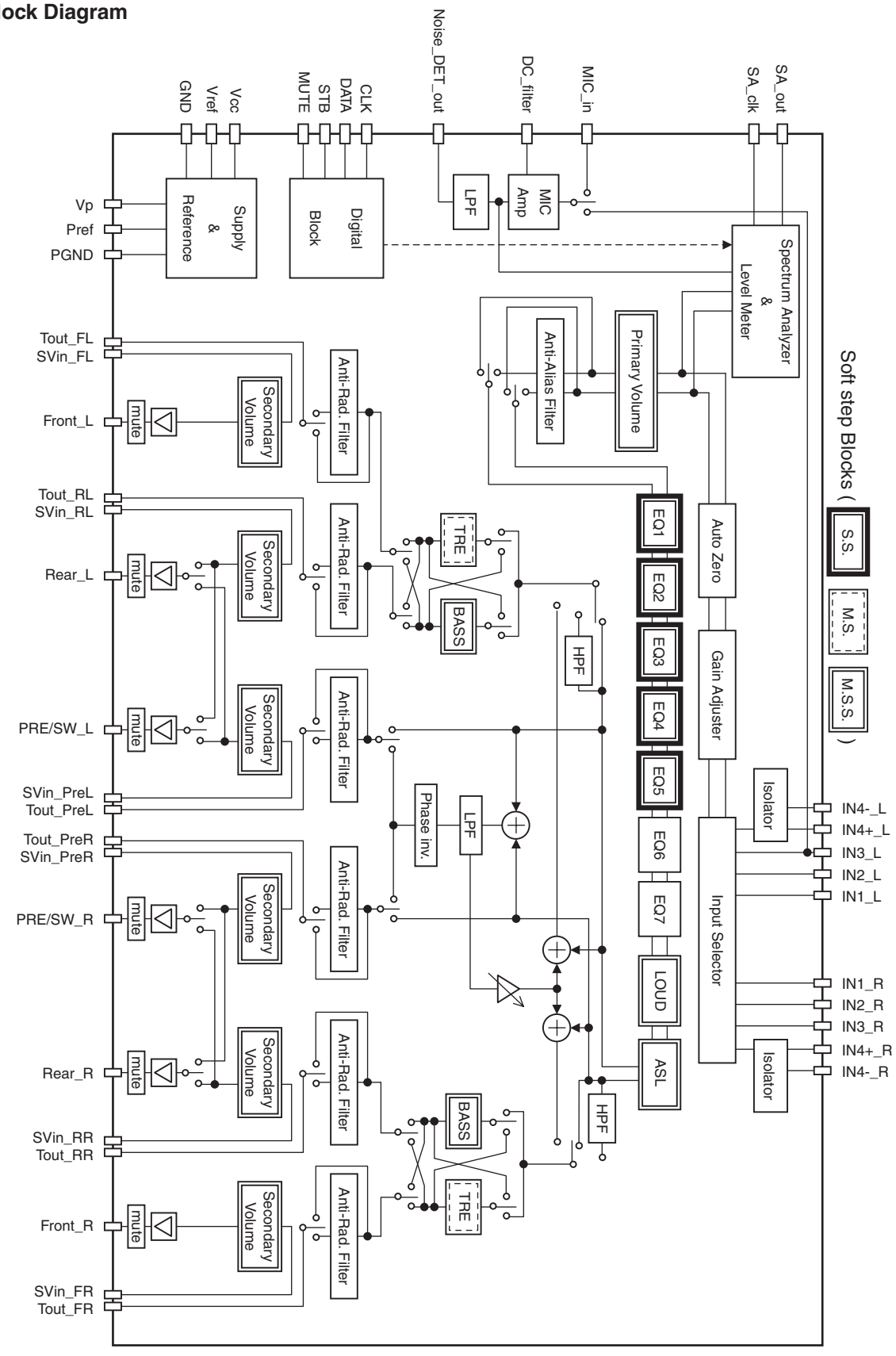
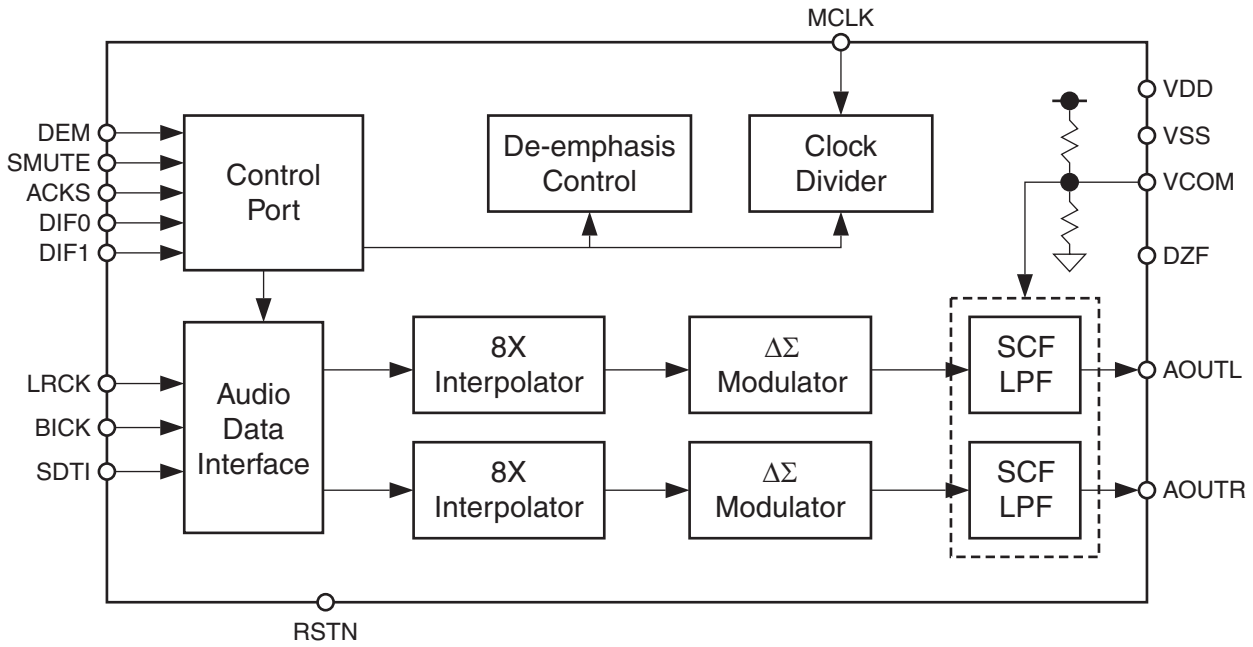
● **Pin Layout**



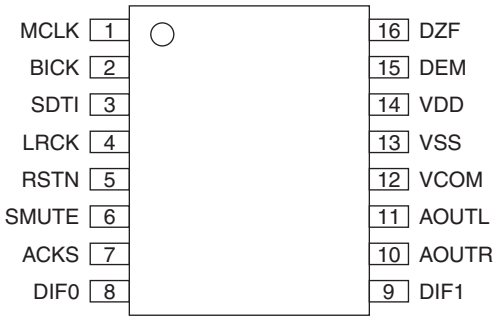
● Block Diagram



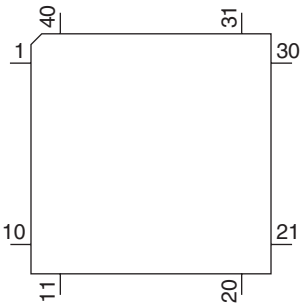
● Block Diagram



● Pin Layout



341S2025



● Pin Functions (341S2025)

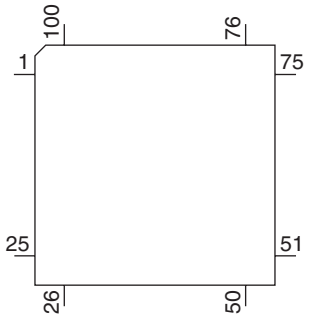
Pin No.	Pin Name	I/O	Function and Operation
1	VCC		Supply voltage, positive terminal
2	XIN		32.768 kHz crystal oscillator or external clock source
3	XOUT		32.768 kHz crystal oscillator or external clock source
4	CLOCK_ENAB	I	CLOCK_OUT enable (active high)
5,6	NC		Not used
7	I2C_SCL	I/O	I2C clock
8-10	I2C_ADDR0-2	I	I2C slave address selection
11	CP_READY	O	CP ready to receive next instruction (active high)
12	MODE0	I	Operating voltage selection
13	MODE1	I	Communication mode selection
14	NC		Not used
15	I2C_SDA	I/O	I2C data
16	MODE2	I	Communication mode selection
17	ROSC	I	Connect via 100 k 1% resistor to VCC
18	SPI_nSS	I	SPI slave select (active low)
19	SPI_SIMO	I	SPI master-to-slave data
20	SPI_SOMI	O	SPI slave-to-master data
21	SPI_UCLK	I	SPI clock
22-31	NC		Not used
32	CLOCK_OUT	O	32.768 kHz clock output, if selected by CLOCK_ENAB
33-37	NC		Not used
38	nRESET	I	CP reset (active low)
39	VSS		Supply voltage, negative terminal
40	VCC		Supply voltage, positive terminal

● Pin Functions (PEG301A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	SYSPW	O	C	System power control output
2	KEYD/NC	I/		Wired remote control key input(UC)/Not used(ES)
3	AMPPW	O	C	AMP power supply control output
4	USBPW	O	C	Control terminal of DD converter for USB power supply
5	NC			Not used
6	BYTE	I		External data bus width change input
7	CNVSS	I		Processor mode change input
8	TELIN	I		TEL mute input
9	NC			Not used
10	$\overline{\text{RESET}}$	I		Reset input
11	XOUT	O		Main clock output
12	VSS	I		GND
13	XIN	I		Main clock input
14	VCC	I		Power supply input(+)
15	$\overline{\text{NMI}}$	I	C	NMI input
16,17	NC			Not used
18	VDCONT	O	C	CD mechanism power supply output
19	RX2	I		IPBUS : Input 2
20	OELPW	O	C	OEL power supply control
21	$\overline{\text{BRXEN}}$	I/O	C	P-BUS : Reception enable input/output
22	SYNC	O	C	DD converter frequency control terminal for USB power supply
23	$\overline{\text{BRST}}$	O	C	P-BUS : Reset output
24	PEE	O	C	BEEP sound output
25	NC			Not used
26	$\overline{\text{BSRQ}}$	I		P-BUS : Service request input
27	RX	I		IPBUS : Input
28	TX	O	N	IPBUS : Output
29	DPDT	O	C	OEL display microcomputer communication data output
30	KYDT	I		OEL display microcomputer communication data input
31,32	NC			Not used
33	USB_TX	O	C	Serial data output
34	USB_RX	I		Serial data input
35,36	ROT1,0	I		Rotary encoder pulse input 1,0
37	PCL	O	C	Output for clock adjustment
38	SWVDD	O	C	OEL display microcomputer chip enable output
39	NC			Not used
40	FLPILM	O	C	Flap illumination output
41	ILMPW	O	C	Illumination power output
42	$\overline{\text{XRST}}$	O	C	TCC860 reset terminal
43,44	NC			Not used
45	USBCTL	O	C	Power supply output control terminal for USB
46	TUNPDI	I	C	TUNER : Data input(PLL)
47	TUNPDO	O	C	TUNER : Data output(PLL)
48	TUNPCK	O	C	TUNER : Clock output(PLL)
49	FLPPW	O	C	Flap motor power supply output
50	$\overline{\text{FOPNSW}}$	I	C	Flap open sense input
51	$\overline{\text{FCLSSW}}$	I	C	Flap close sense input
52	FLPCLS	O	C	Flap close operation output
53	FLPOPN	O	C	Flap open operation output
54	USBTESTTRK	O	C	TrackUP operation terminal(In USB test mode, I/O : I)
55	USBTESTNOW	O	C	TrackUP operation terminal
56	USBTESTNG	O	C	OK/NG output terminal
57	EMUTE	O	C	EVOL : Mute
58	SACLK	O	C	Level indicator clock output
59	USBTESTIN	I	C	TESTIN terminal for USB only

Pin No.	Pin Name	I/O	Format	Function and Operation
60	VCC	I		Power supply input(+)
61	NC			Not used
62	VSS	I		GND
63-66	NC			Not used
67	DALMON	O	C	For consumption current reduction output
68	NC			Not used
69	$\overline{\text{TUNPCE2}}$	O	C	TUNER : Chip enable output(EEPROM)
70	TUNPCE1	O	C	TUNER : Chip enable output(PLL)
71	ROMCS	O	C	ROM correction chip select output
72	$\overline{\text{ASENS}}$	I		ACC sense input
73	$\overline{\text{BSENS}}$	I		Backup sense input
74	ROMCK	O	C	ROM correction clock output
75	ROMDATA	I/O	C	ROM correction data input/output
76	VST	O	C	EVOL : Strobe output
77	VDT	O	C	EVOL : Data output
78	VCK	O	C	EVOL : Clock output
79	IPPW	O	C	IPBUS : Driver power supply control output
80	ASENBO	O	C	IPBUS : Slave ACC sense output
81	$\overline{\text{ISENS}}$	I		Illumination sense
82	NC			Not used
83	MODEL0	I		Model select input 0
84	TUAUSEL	O	C	EVOL : Source select switch
85	MUTE	O	C	System mute output
86	TESTIN	I		Test program input
87	$\overline{\text{FLG}}$	I		USBCONT control terminal
88	NC			Not used
89	KEYAD/NC	I/		Wired remote control AD input(UC)/Not used(ES)
90	SAOUT	I		Level indicator input
91	DSENS	I		Detach sense input
92	$\overline{\text{CDRST}}$	O	C	CD RESET output
93	NC			Not used
94	AVSS	I		Analog GND
95	SL	I		Signal level input(Field intensity)
96	VREF	I		Reference voltage input
97	AVCC	I		Analog power supply input
98	BSI/TSI	I		P-BUS : Input/Test program : data input
99	BSO/TESTDO	O	C	P-BUS : Output/Test program : data output
100	BSCK/TSCK	O	C	P-BUS : Clock output/Test program : clock output

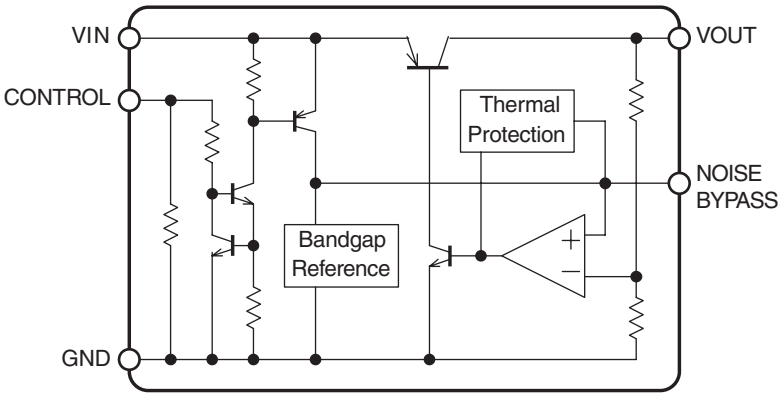
PEG301A



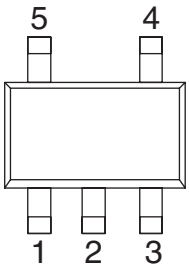
Format	Meaning
C	CMOS
N	Nch open drain

NJM2872BF18
NJM2872BF05

● Block Diagram

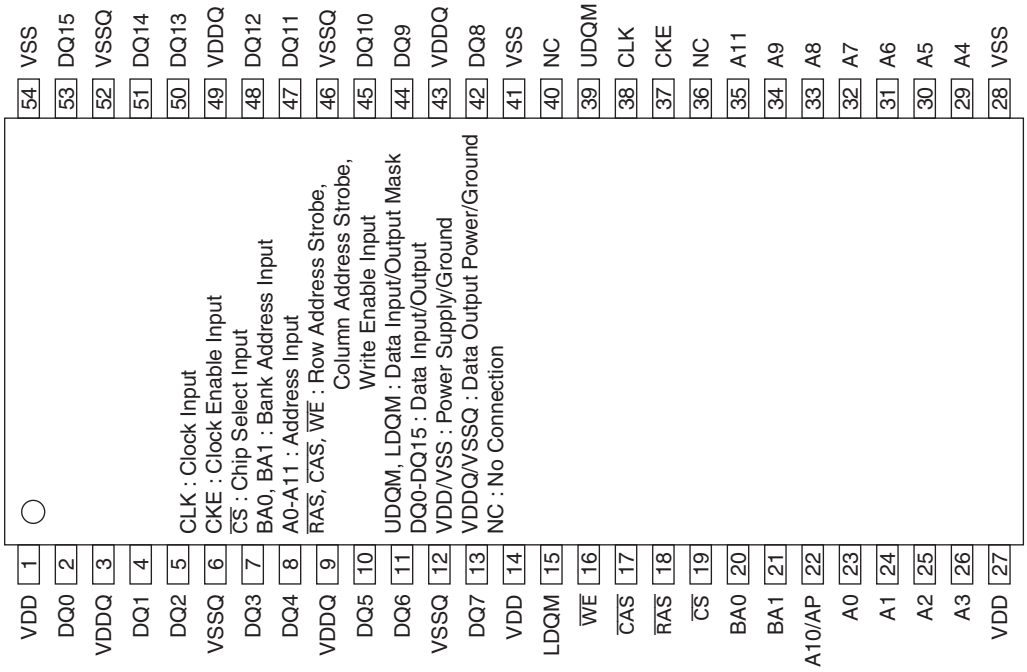


● Pin Layout

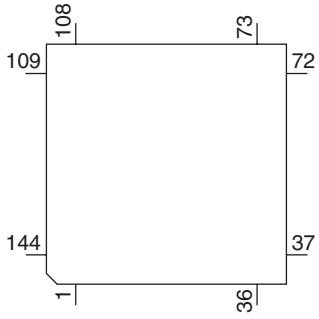


1. VIN
2. GND
3. CONTROL
4. NOISE BYPASS
5. VOUT

HY57V641620ETP-H



PE5547A



Format	Meaning
C	CMOS
N	Nch open drain

● Pin Functions (PE5547A)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	ROMDATA	I/O	/C	E2PROM : Data input/output
2	ROMCK	O	C	E2PROM : Clock output
3	ROMCS	O	C	E2PROM : Chip select output
4	NC			Not used
5	LOEJ	O	C	LOAD/EJECT direction switching output
6	DSCSNS	I		Disc sense input
7	$\overline{8SNS}$	I		8 cm disc detection input
8	$\overline{12SNS}$	I		12 cm disc detection input
9	$\overline{HOME}$	I		HOME SW sense input
10	TEMP			Temperature information sense input
11	VDSENS			VD power supply short circuit/earth fault sense input
12	$\overline{ADENA}$	O	C	A/D reference voltage supply control output
13	ADC.VDD			Power supply for A/D converter
14	ADC.GND			Ground for A/D converter
15	FLMD0	I		Flash writing control terminal
16	$\overline{RESET}$	I		Internal microcomputer reset terminal
17	PULLDOWN	O	C	Pull-down
18	NC			Not used
19	$\overline{TESTIN}$	I		Chip check, test program start-up input
20	NC			Not used
21	BSI	I	N	P-BUS : Serial data input
22	BSO	O	N	P-BUS : Serial data output
23	$\overline{BSCK}$	I/O	N	P-BUS : Serial clock input/output
24	FTxD	O	N	Tx for flash rewriting
25	FRxD	I		Rx for flash rewriting
26	BRXEN	I/O	/C	P-BUS : Reception enable input/output
27	$\overline{BSRQ}$	I/O	/C	P-BUS : Service request input
28	NC			Not used
29	$\overline{FMODE}$	I		Flash self-rewriting mode start-up input
30	FLRQ	O	C	Flash self-rewriting reset voltage control
31	ROM	I		Open(EMPH)
32-36	NC			Not used
37	MCKRQ	O	N	CLOCK request
38	LRCKOK	O	N	LRCK reference enable
39	$\overline{PUEN}$	O	C	Pickup hologram power supply control output
40	CD3VON	O	C	CD + 3.3 V power supply control output
41	CONT	O	C	Servo driver power supply control output
42	VDCONT	O	C	VD power supply control output
43	CLCONT	O	C	CRG/LOAD-EJECT switching control output
44	CDMUTE	O	C	CD mute control output
45	TEST	I		Test terminal
46	$\overline{BRST}$	I		P-BUS : Communication reset input
47	REGS			Capacitor connection for standby
48	C.VDD			Power supply for internal microcomputer
49	C.GND			Ground for internal microcomputer
50	XTAL	I		Connected to the crystal oscillator
51	X.GND			Ground for the crystal oscillator
52	$\overline{XTAL}$	O		Connected to the crystal oscillator
53	X.VDD			Power supply for the crystal oscillator
54	DA.VDD			Power supply for DAC
55	LOUT	O		Output of audio for the left channel
56	DA.GND			Ground for DAC
57	REGC			Connected to the capacitor for band gap
58	DA.GND			Ground for DAC
59	ROUT	O		Output of audio for the right channel

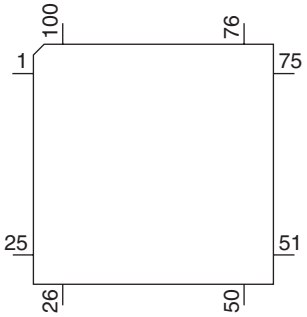
Pin No.	Pin Name	I/O	Format	Function and Operation
60	DA.VDD			Power supply for DAC
61	D.GND			Ground for digital circuits
62	D.VDD			Power supply for digital circuits
63	REG16			Capacitor connection for 1.6 V regulator
64	LRCK	O	C	3-wire audio LR clock output
65	SCKO	O	C	3-wire audio serial I/F clock output
66	DOUT	O	C	3-wire audio serial I/F data output
67-69	SVMON0-2	I/O	/C	Servo monitor input/output 0-2
70	SVMON3	I/O	/C	Servo monitor input/output 3(Ext MCK IN)
71	C33M	O	C	DRAM CLOCK
72	($\overline{RCS}$)	O	C	DRAM CS
73	(CKE)	O	C	DRAM CKE output
74	$\overline{RAS}$	O	C	Output of DRAM RAS
75	$\overline{CAS0}$(LDQM)	O	C	DRAM Lower CAS(LDQM) output
76	$\overline{CAS1}$(UDQM)	O	C	DRAM Upper CAS(UDQM) output
77	$\overline{WE}$	O	C	Output of DRAM WE
78	$\overline{OE}$($\overline{CAS}$)	O	C	DRAM OE(CAS) output
79-94	RDB0-15	I/O	/C	Input/output of DRAM data 0-15
95	IO.GND			Ground for I/O terminal
96	IO.VDD			Power supply for I/O terminal
97-108	RA0-11	O	C	Output of DRAM address 0-11
109	FD	O	C	Output of focus drive PWM
110	TD	O	C	Output of tracking drive PWM
111	SD	O	C	Output of thread drive PWM
112	MD	O	C	Output of spindle drive PWM
113	EFM	O		Output of EFM signals
114	ASY	I		Asymmetry input
115	ATEST	O		Analog tests
116	A.VDD			Power supply for the analog system
117	A.GND			Ground for the analog system
118	RFI	I		Input of RF
119	AGCO	O		Output of RF
120	C3T			Connection to the capacitor for detecting 3T
121	AGCI	I		Input of AGC
122	RFO	O		Output of RF(AGC)
123,124	EQ2,1	I		Equalizer 2, 1
125	RF2-	I		Reversal input of RF2
126	RF-	I		Reversal input of RF
127	A.GND			Ground for the analog system
128	A.VDD			Power supply for the analog system
129	A	I		Input of A
130	B	I		Input of B
131	F	I		Input of F
132	E	I		Input of E
133	REFOUT	O		Output of reference voltage
134	FE-	I		Reversal input of FE
135	FEO	O		Output of FE
136	ADCIN	I		FE,TE A/D converter input
137	TE-	I		Reversal input of TE
138	TEO	O		Output of TE
139	TE2	O		TE2
140	TEC	I		TEC
141	LD	O		Output of LD
142	PD	I		Input of PD
143	AD.VDD			Power supply for servo ADC
144	AD.GND			Ground for servo ADC

● Pin Functions (PEG312A8)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	NC			Not used
2	ROMDT	I/O	C	ROM correction data input/output
3	ROMCK	O	C	ROM correction clock output
4	REM	I		Remote control input
5	ROMCS	O	C	ROM correction chip select output
6	BYTE	I		External data bus width change input(VSS)
7	CNVSS	I		Processor mode change input
8,9	NC			Not used
10	$\overline{\text{RESET}}$	I		Reset input
11	XOUT	O		Clock output
12	VSS1			GND
13	XIN	I		Clock input
14	VCC1			Power supply input
15	$\overline{\text{NMI}}$	I		NMI input
16	NC			Not used
17	$\overline{\text{KS3}}$	O	C	Key strobe 3(Not used)
18-20	$\overline{\text{KS2}}$-$\overline{0}$	I/O	C	Key strobe 2-0
21	NC			Not used
22	DSEL	O	C	OEL driver : Display data select
23	NC			Not used
24	CKD	O	C	OEL driver : Data transfer and driver clock frequency
25	NC			Not used
26	LS	O	C	OEL driver : Line sync signal
27	DPDT	I	N	System controller communication : Display data input
28	KYDT	O	N	System controller communication : Key data output
29-32	NC			Not used
33	OELD	O	C	OEL driver : Display data
34	NC			Not used
35	CLK0	I	C	OEL driver : Clock input for UART0
36	NC			Not used
37	$\overline{\text{RDY}}$	I	C	RDY signal input
38	NC			Not used
39	$\overline{\text{HOLD}}$	I	C	HOLD signal input
40,41	NC			Not used
42	$\overline{\text{RD}}$	O	C	Image ROM : Read strobe
43-45	NC			Not used
46,47	CS2,1	O	C	Image ROM : Bank address 1,0
48	$\overline{\text{CS0}}$	O	C	External extended ROM chip select(image ROM)
49	A19	O	C	Image ROM : Address bus 19 bit
50	A18	O	C	Non connection
51	A17	O	C	Image ROM : Address bus 17 bit
52	A16	O	C	Image ROM : Address bus 16 bit
53	A15	O	C	Image ROM : Address bus 15 bit
54	A14	O	C	Image ROM : Address bus 14 bit
55	A13	O	C	Image ROM : Address bus 13 bit
56	A12	O	C	Image ROM : Address bus 12 bit
57	A11	O	C	Image ROM : Address bus 11 bit
58	A10	O	C	Image ROM : Address bus 10 bit
59	A9	O	C	Image ROM : Address bus 9 bit
60	VCC2			Power supply input
61	A8	O	C	Image ROM : Address bus 8 bit
62	VSS2			GND
63	A7	O	C	Image ROM : Address bus 7 bit
64	A6	O	C	Image ROM : Address bus 6 bit
65	A5	O	C	Image ROM : Address bus 5 bit

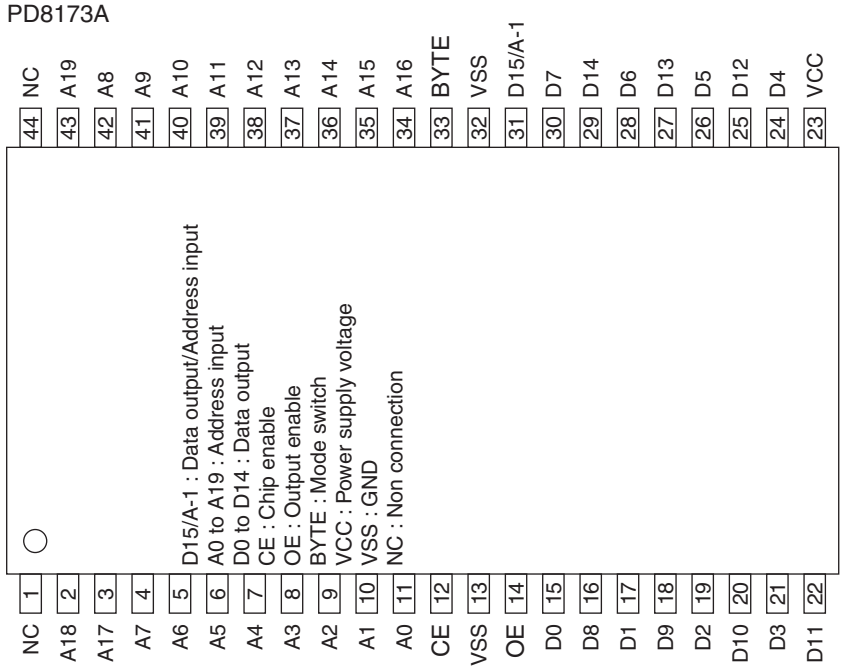
Pin No.	Pin Name	I/O	Format	Function and Operation
66	A4	O	C	Image ROM : Address bus 4 bit
67	A3	O	C	Image ROM : Address bus 3 bit
68	A2	O	C	Image ROM : Address bus 2 bit
69	A1	O	C	Image ROM : Address bus 1 bit
70	A0	O	C	Non connection
71	D15	I	C	Image ROM : Data bus 15 bit
72	D14	I	C	Image ROM : Data bus 14 bit
73	D13	I	C	Image ROM : Data bus 13 bit
74	D12	I	C	Image ROM : Data bus 12 bit
75	D11	I	C	Image ROM : Data bus 11 bit
76	D10	I	C	Image ROM : Data bus 10 bit
77	D9	I	C	Image ROM : Data bus 9 bit
78	D8	I	C	Image ROM : Data bus 8 bit
79	D7	I	C	Image ROM : Data bus 7 bit
80	D6	I	C	Image ROM : Data bus 6 bit
81	D5	I	C	Image ROM : Data bus 5 bit
82	D4	I	C	Image ROM : Data bus 4 bit
83	D3	I	C	Image ROM : Data bus 3 bit
84	D2	I	C	Image ROM : Data bus 2 bit
85	D1	I	C	Image ROM : Data bus 1 bit
86	D0	I	C	Image ROM : Data bus 0 bit
87	NC			Not used
88	JOYST	I	C	Rotary commander AD input terminal
89,90	NC			Not used
91	$\overline{KD3}$	O	C	Key data 3(Not used)
92,93	$\overline{KD2}$,$\overline{1}$	I	C	Key data 2,1
94	AVSS			Analog GND
95	$\overline{KD0}$	I	C	Key data 0
96	VREF	I		Reference voltage input
97	AVCC			Analog power supply input
98	$\overline{DIM}$	O	C	Terminal for Dimmer control
99,100	NC			Not used

PEG312A8

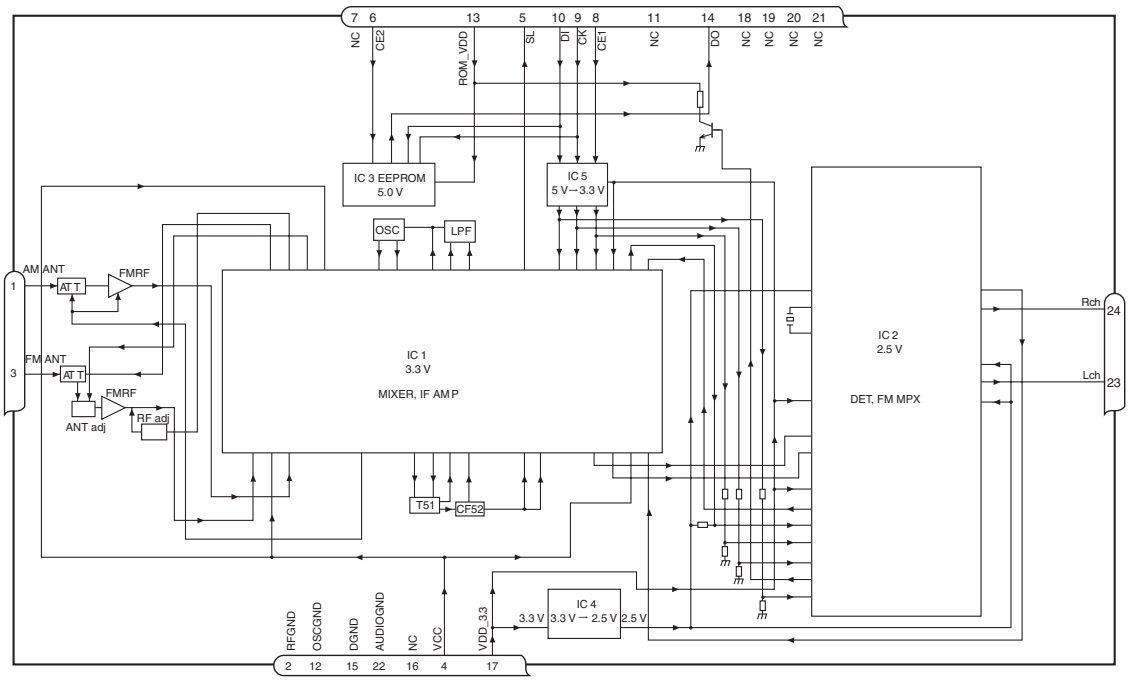


Format	Meaning
C	CMOS
N	Nch open drain

PD8174A
PD8173A

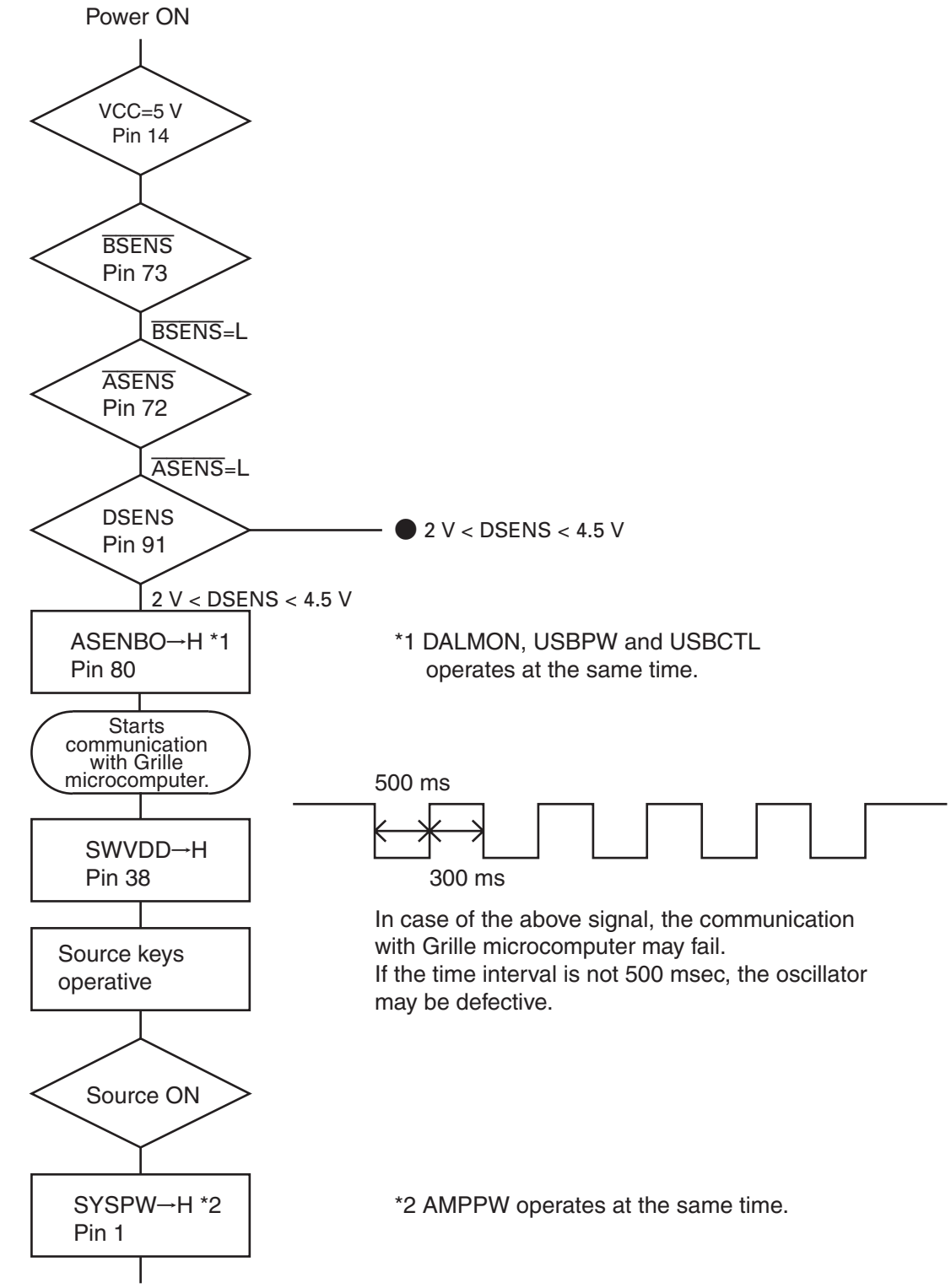


● FM/AM Tuner Unit


7 6 13 5 10 9 8 11 14 18 19 20 21
NC CE2 ROM_VDD SL DI CK CE1 NC DO NC NC NC NC
IC 3 EEPROM 5.0 V
IC 5 5 V—3.3 V
OSC
LPF
AM ANT
FMRF
AT T
FM ANT
ANT adj
RF adj
IC 1 3.3 V MIXER, IF AMP
IC 2 2.5 V DET, FM MPX
Rch
Lch
24
23
T51
CF52
IC 4 3.3 V 3.3 V — 2.5 V 2.5 V
RFGND OSCGND DGND AUDIOGND NC VCC VDD_3.3
2 12 15 22 16 4 17

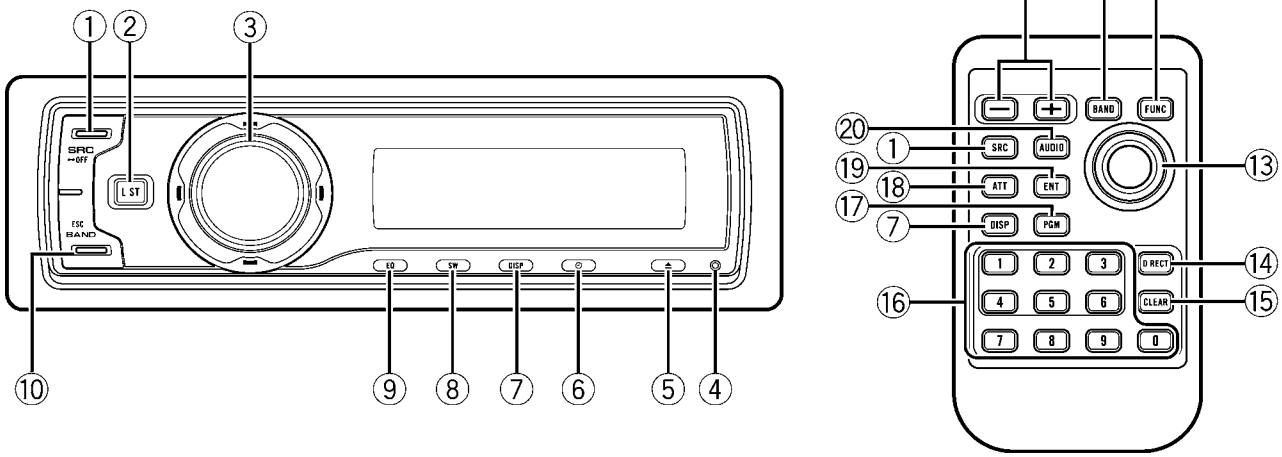
No.	Symbol	I/O	Explain	
1	AMANT	I	AM antenna input	AM antenna input high impedance AMANT pin is connected with an all antenna by way of 4.7 µH. (LAU type inductor) A series circuit including an inductor and a resistor is connected with RF ground for the countermeasure against the hum of power transmission line.
2	RFGND		RF ground	Ground of antenna block
3	FMANT	I	FM antenna input	Input of FM antenna 75 Ω Surge absorber (DSP-201M-S00B) is necessary.
4	VCC		power supply	The power supply for analog block. D.C 8.4 V ± 0.3 V
5	SL	O	signal level	Output of FM/AM signals level
6	CE2	I	chip enable-2	Chip enable for EEPROM "Low" active
7	NC		non connection	Not used
8	CE1	I	chip enable-1	Chip enable for AF•RF "High" active
9	CK	I	clock	Clock
10	DI	I	data in	Data input
11	NC		non connection	Not used
12	OSCGND		osc ground	Ground of oscillator block
13	ROM_VDD		power supply	Power supply for EEPROM pin 13 is connected with a power supply of micro computer.
14	DO	O	data out	Data output
15	DGND		digital ground	Ground of digital block
16	NC		non connection	Not used
17	VDD_3.3		power supply	The power supply for digital block. 3.3 V ± 0.2 V
18	NC		non connection	Not used
19	NC		non connection	Not used
20	NC		non connection	Not used
21	NC		non connection	Not used
22	AUDIOGND		audio ground	Ground of audio block
23	L ch	O	L channel output	FM stereo "L-ch" signal output or AM audio output
24	R ch	O	R channel output	FM stereo "R-ch" signal output or AM audio output

7.3 OPERATIONAL FLOW CHART



Completes power-on operation.
(After that, proceed to each source operation)

8. OPERATIONS



What's What

Head unit

① **SOURCE button**
This unit is turned on by selecting a source.
Press to cycle through all the available sources.

② **LIST button**
Press to display the disc title list, track title list, folder list, file list or preset channel list depending on the source.

③ **MULTI-CONTROL**
Move to perform manual seek tuning, fast forward, reverse and track search controls.
Also used for controlling functions.
Turn to increase or decrease the volume.

④ **RESET button**
Press to reset the microprocessor.

⑤ **EJECT button**
Press to eject a CD from your built-in CD player.
Press and hold to open or close the front panel.

⑥ **CLOCK button**
Press to change to the clock display. Press and hold to change the channel select mode when XM tuner or SIRIUS tuner is selected as the source.

⑦ **DISPLAY button**
Press to select different displays.

⑧ **SW button**
Press to select the subwoofer setting menu.
Press and hold to select the bass boost setting menu.

⑨ **EQ button**
Press to select various equalizer curves.

⑩ **BAND button**
Press to select among three FM bands and one AM band and to cancel the control mode of functions.

Remote control

Operation is the same as when using the buttons on the head unit.

⑪ **VOLUME buttons**
Press to increase or decrease the volume.

⑫ **FUNCTION button**
Press to select functions.

⑬ **Joystick**
Move to perform manual seek tuning, fast forward, reverse and track search controls. Also used for controlling functions. Functions are the same as **MULTI-CONTROL** except for volume control.

⑭ **DIRECT button**
Press to directly select the desired track.

⑮ **CLEAR button**
Press to cancel the input number when **0** to **9** are used.

⑯ **0 to 9 buttons**
Press to directly select the desired track, preset tuning or disc. Buttons **1** to **6** can operate the preset tuning for the tuner or disc number search for the multi-CD player.

⑰ **PGM button**
Press to operate the preprogrammed functions for each source.

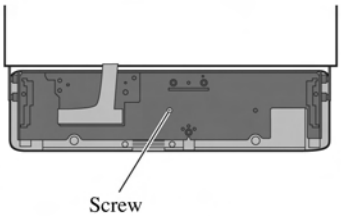
⑱ **ATT button**
Press to quickly lower the volume level, by about 90%. Press once more to return to the original volume level.

⑲ **ENTERTAINMENT button**
Press to change to the entertainment display.

⑳ **AUDIO button**
Press to select various sound quality controls. ■

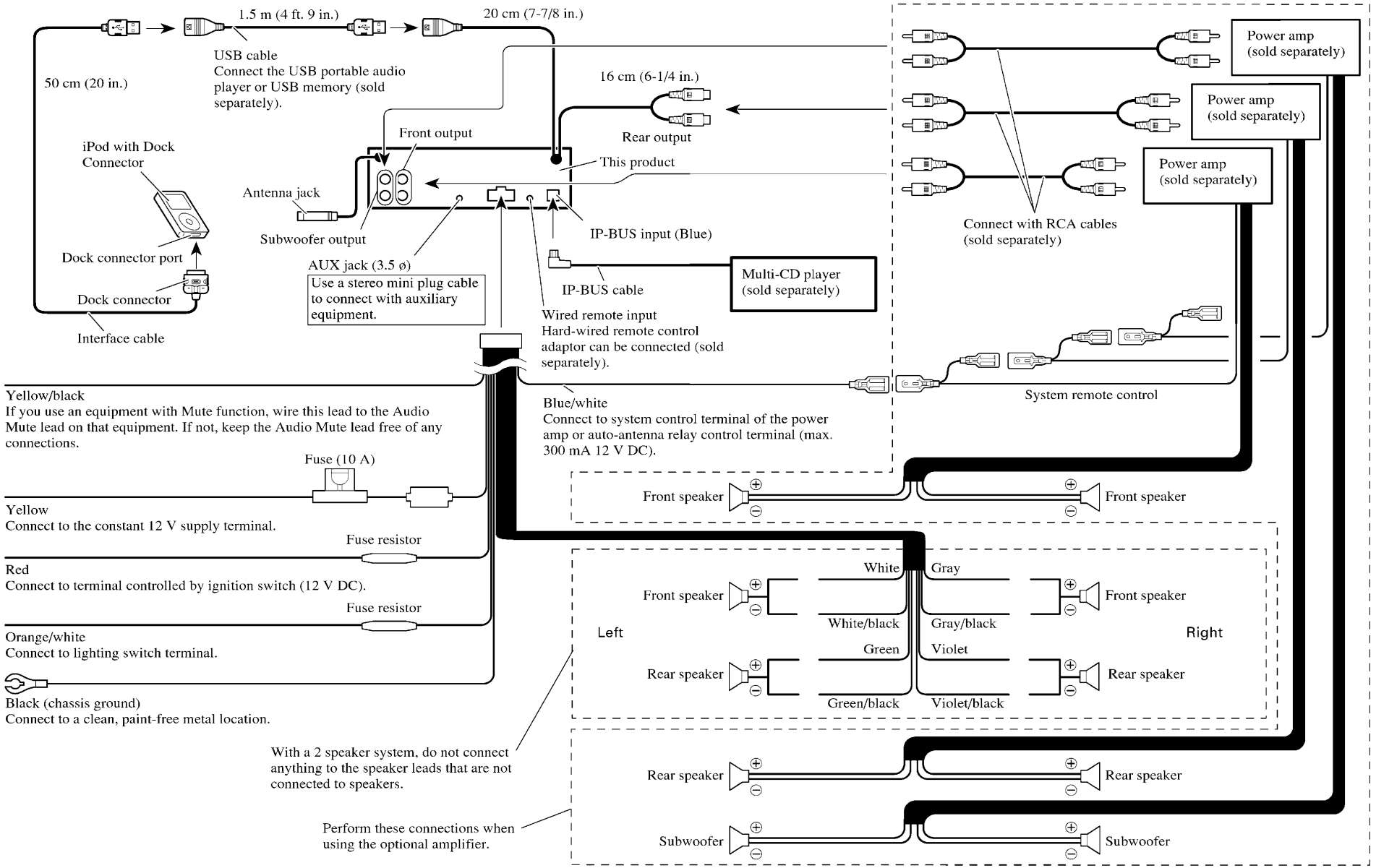
Fastening the front panel

If you do not plan to detach the front panel, the front panel can be fastened with supplied screw.



Screw
JPZ20P060FTB(UC)
XXX7019(ES)

Connection Diagram


1.5 m (4 ft. 9 in.)
20 cm (7-7/8 in.)
50 cm (20 in.)
USB cable
Connect the USB portable audio player or USB memory (sold separately).
16 cm (6-1/4 in.)
Rear output
Front output
This product
iPod with Dock Connector
Antenna jack
Subwoofer output
AUX jack (3.5 ø)
Use a stereo mini plug cable to connect with auxiliary equipment.
IP-BUS input (Blue)
IP-BUS cable
Multi-CD player (sold separately)
Dock connector port
Dock connector
Interface cable
Wired remote input
Hard-wired remote control adaptor can be connected (sold separately).
Power amp (sold separately)
Power amp (sold separately)
Power amp (sold separately)
Connect with RCA cables (sold separately)
System remote control
Yellow/black
If you use an equipment with Mute function, wire this lead to the Audio Mute lead on that equipment. If not, keep the Audio Mute lead free of any connections.
Blue/white
Connect to system control terminal of the power amp or auto-antenna relay control terminal (max. 300 mA 12 V DC).
Fuse (10 A)
Yellow
Connect to the constant 12 V supply terminal.
Fuse resistor
Red
Connect to terminal controlled by ignition switch (12 V DC).
Fuse resistor
Orange/white
Connect to lighting switch terminal.
Black (chassis ground)
Connect to a clean, paint-free metal location.
Front speaker
Front speaker
White
Gray
Front speaker
Front speaker
White/black
Gray/black
Left
Right
Green
Violet
Rear speaker
Rear speaker
Green/black
Violet/black
With a 2 speaker system, do not connect anything to the speaker leads that are not connected to speakers.
Rear speaker
Rear speaker
Perform these connections when using the optional amplifier.
Subwoofer
Subwoofer

A

B

C

D

E

F

● Jigs List

Name	Jig No.	Remarks
Test Disc	TCD-782	Checking the grating
L.P.F.		Checking the grating (Two pieces)

● Grease List

Name	Grease No.	Remarks
Grease	GEM1024	CD Mechanism Module, EXTERIOR
Grease	GEM1045	CD Mechanism Module
Grease	GEM1069	EXTERIOR

Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

Portions to be cleaned	Cleaning tools
CD pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

Pioneer sound.vision.soul

Service Manual

ORDER NO.
CRT3815

CD MECHANISM MODULE(S10.5COMP2)

CX-3195

This service manual describes the operation of the CD mechanism module incorporated in models listed in the table below.
When performing repairs use this manual together with the specific manual for model under repair.

Model	Service Manual	CD Mechanism Module
DEH-2900MP/XN/EW5 DEH-2920MP/XN/EW5 DEH-2900MPB/XN/EW5 DEH-2910MP/XN/UR	CRT3802	CXK5760
DEH-2950MP/XN/ES DEH-2950MP/XN/ES1 DEH-2990MP/XN/ID	CRT3820	CXK5760
DEH-P390MP/XU/UC DEH-P3900MP/XU/UC	CRT3816	CXK5760
DEH-P4950MP/XU/ES DEH-P4950MP/XU/CN5	CRT3817	CXK5760
DEH-P2900MP/XU/UC	CRT3823	CXK5760
DEH-P3950MP/XU/ES DEH-P3950MP/XU/CN5	CRT3824	CXK5760
DEH-P5900MP/XU/EW5	CRT3828	CXK5760

Model	Service Manual	CD Mechanism Module
DEH-3900MP/XN/EW5	CRT3804	CXK5760
DEH-3990MP/XN/ID	CRT3829	CXK5760
DEH-P40MP/XU/EW5	CRT3834	CXK5760
DEH-P4950MP/XU/ES	CRT3835	CXK5760
DEH-P490IB/XN/UC DEH-P4900IB/XN/UC	CRT3846	CXK5760
DEH-P4900IB/XN/EW5	CRT3847	CXK5760
DEH-P5950IB/XN/ES DEH-P5950IB/XN/ES1 DEH-P5990IB/XN/ID	CRT3848	CXK5760
DEH-P590IB/XN/UC DEH-P5900IB/XN/UC	CRT3851	CXK5760
DEH-P6900IB/XN/EW5	CRT3852	CXK5760
DEH-P6950IB/XN/ES DEH-P6950IB/XN/ES1	CRT3853	CXK5760

PIONEER CORPORATION 4-1, Meguro 1-chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS (USA) INC. P.O. Box 1760, Long Beach, CA 90801-1760, U.S.A.
PIONEER EUROPE NV Haven 1087, Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE. LTD. 253 Alexandra Road, #04-01, Singapore 159936
ⓒ**PIONEER CORPORATION 2006**

K-ZZA. OCT. 2006 Printed in Japan

CONTENTS

1. CIRCUIT DESCRIPTIONS 3
2. MECHANISM DESCRIPTIONS 20
3. DISASSEMBLY 22

1. CIRCUIT DESCRIPTIONS

The recent mainstay of the CD LSI is the LSI integrating the core DSP with DAC or RF amplifier, which are generally employed as peripheral circuits, however, PE5547A, used in this product, is an LSI integrating the afore-mentioned LSI unit and microcomputer unit in one chip.

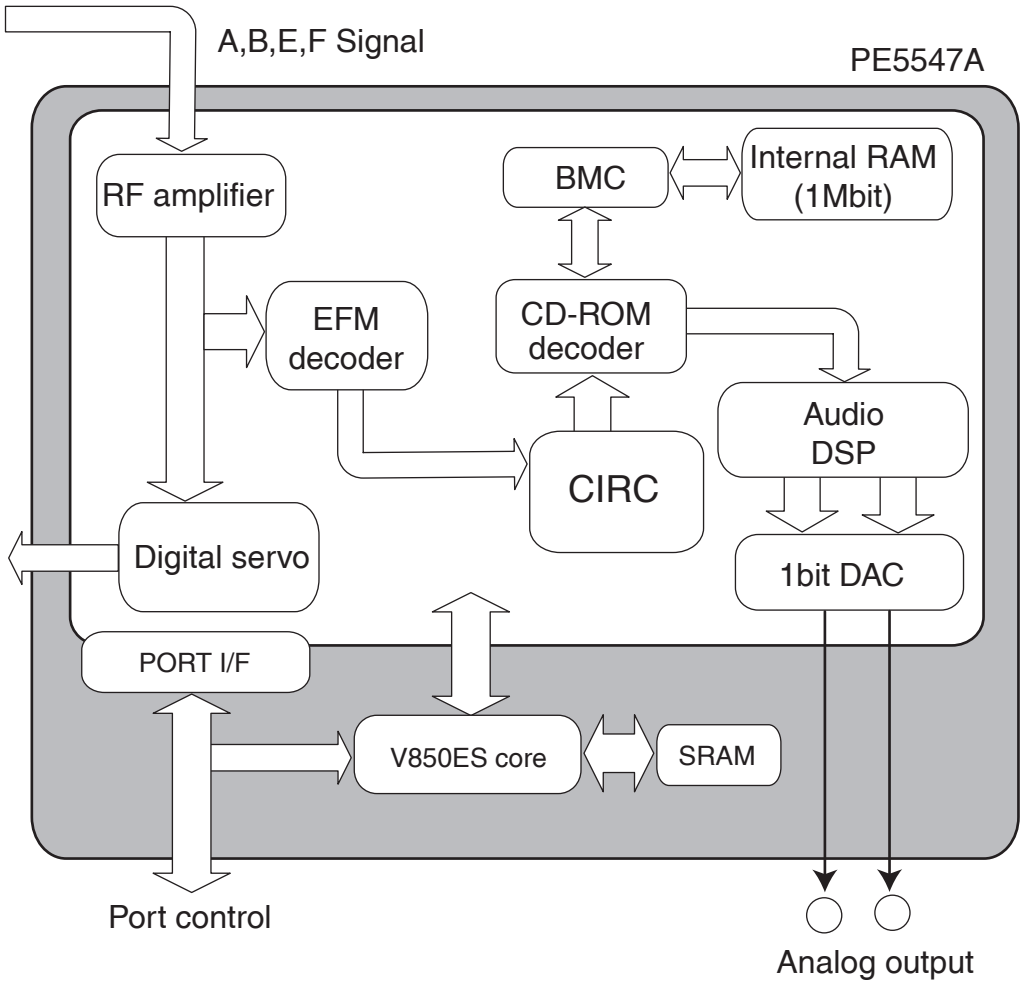


Fig.1.0.1 Block diagram of CD LSI PE5547A

1.1 PREAMPLIFIER BLOCK

In the preamplifier block, the pickup output signals are processed to generate signals that are used in the subsequent blocks: servo, demodulator, and control blocks. Signals from the pickup are I/V converted in the pickup with the preamplifier with built-in photo detectors, and after added with the RF amplifier, they are used to produce such signals as RF, FE, TE, and TE zero-cross signals. The preamplifier block is built in CD LSI PE5547A (IC201), whose parts are described individually below. Incidentally, as this LSI employs a single power supply (+ 3.3 V) specification, the reference voltages of this LSI and the pickup are the REFO (1.65 V) for both. The REFO is an output obtained from REFOUT in the LSI via the buffer amplifier, and is output from the pin 133 of this LSI. All measurements will be performed with this REFO as the reference.

Caution: Be careful not to short-circuit the REFO and GND when measuring.

1.1.1 APC (Automatic Power Control) circuit

Since laser diodes have extremely negative temperature characteristics in optical output when driven in constant current, it is necessary to control the current with the monitor diodes in order to keep the output constant. This is the feature of the APC circuit. The LD current is obtained by measuring the voltage between LD1 and V3R3, and divide the value by 7.5 (ohms), which becomes about 30 mA. The voltage between LD1 and V3R3 is set to about 225 mV.

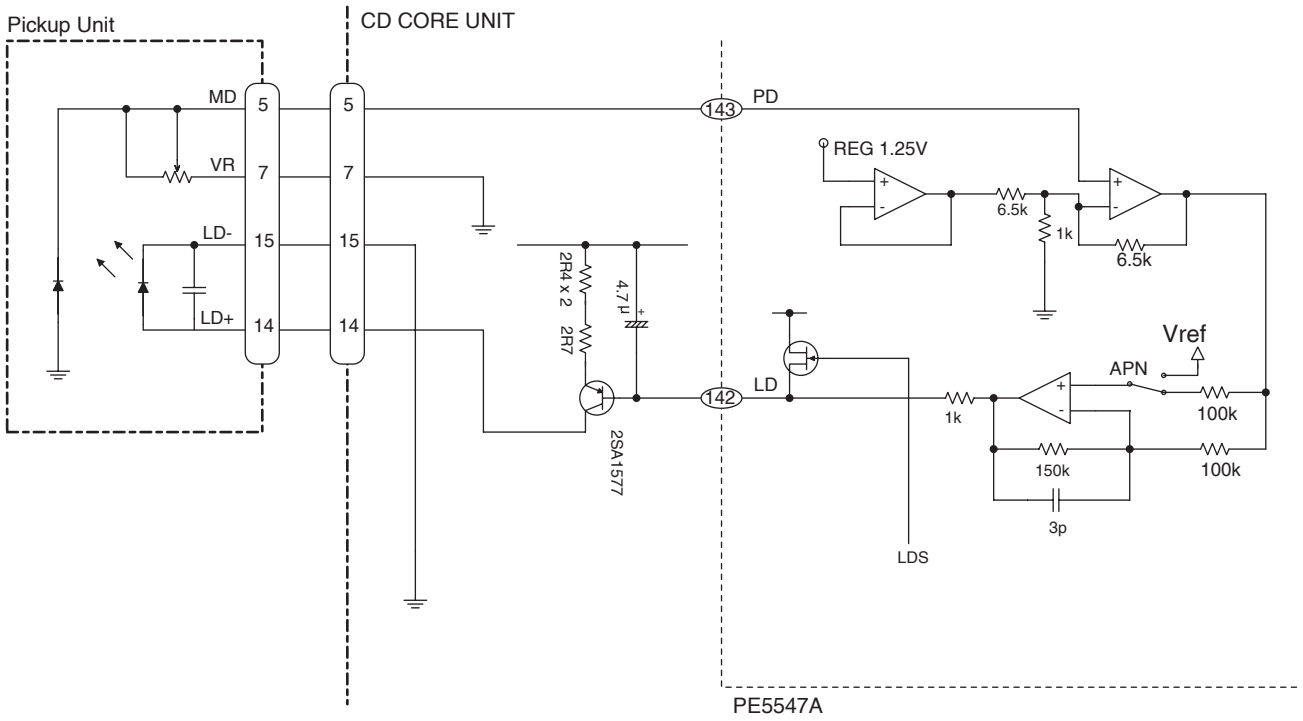


Fig.1.1.1 APC

1.1.2 RF and RFAGC amplifiers

The output from the photo-detector (A + C) and (B + D) is provided from the RFO terminal as the RF signal (which can be used for eye-pattern check), after it is added, amplified, and equalized inside this LSI. The low frequency component of the voltage RFO is calculated as below.

RFO = (A + B + C + D) x 2

The RFO is used for the FOK generation circuit and RF offset adjustment circuit.

The RFO signal, output from the pin 122, is A/C-coupled externally, input to the pin 121, and amplified in the RFAGC amplifier to obtain the RFAGC signal.

Also, this LSI is equipped with the RFAGC auto-adjustment function, explained below, which switches feedback gains of the RFAGC amplifier so that the RFO output will be 1.5 V.

This RFO signal is also used for the EFM, DFCT, MIRR, and RFAGC auto-adjustment circuits.

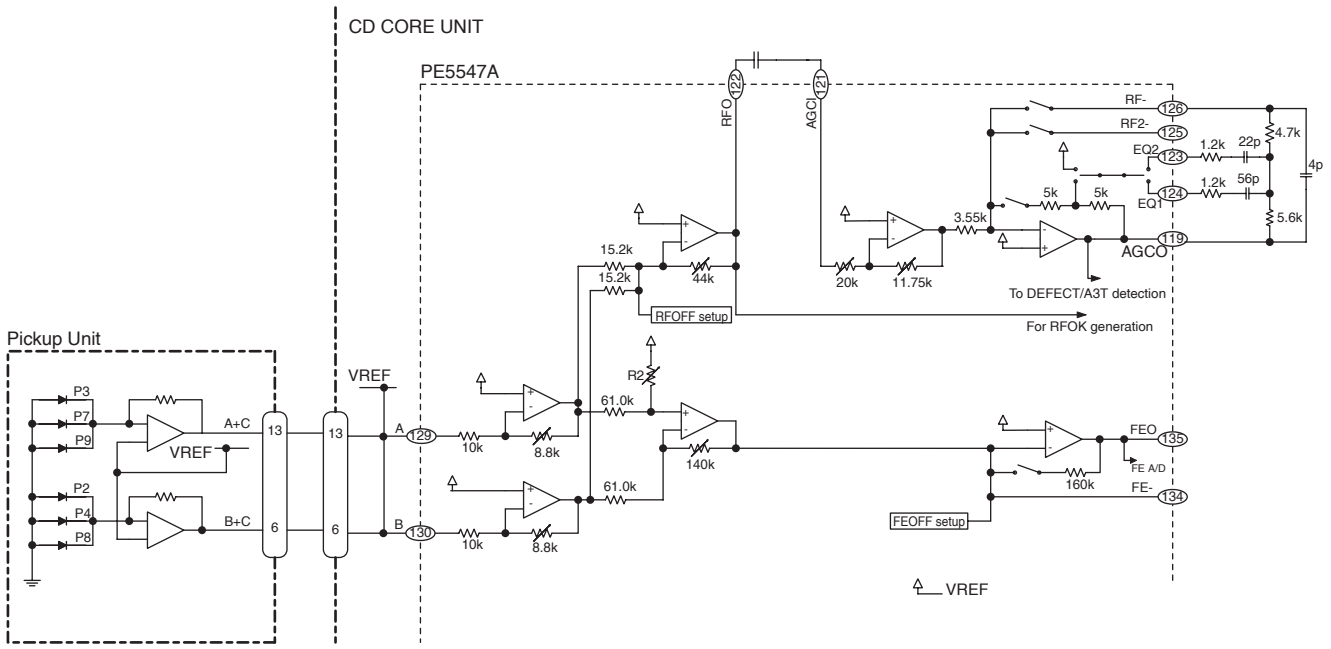


Fig.1.1.2 RF/AGC/FE

1.1.3 Focus error amplifier

The photo-detector outputs (A + C) and (B + D) are passed through the differential amplifier and the error amplifier, and (A + C - B - D) is provided from the pin 135 as the FE signal. The low frequency component of the voltage FE is calculated as below.

FE = (A + C - B - D) x 8.8k / 10k x 111k / 61k x 160k / 72k

= (A + C - B - D) x 3.5

For the FE outputs, an S-shaped curve of 1.5 Vp-p is obtained with the REFO as the reference. The cutoff frequency for the subsequent stage amplifiers is 14.6 kHz.

1.1.4 RFOK circuit

This circuit generates the RFOK signal, which indicates the timing to close the focus loop and focus-close status during the play mode, from the pin 70. As for the signal, "H" is output in closing the focus loop and during the play mode.

Additionally, the RFOK becomes "H" even in a non-pit area, since the DC level of the RFO signal is peak-held in the subsequent digital block and compared at a certain threshold level to generate the RFOK signal. Therefore, the focus is closed even on a mirror-surface area of a disc. This signal is also supplied to the microcomputer via the low-pass filer as the FOK signal, which is used for protection and gain switching of the RF amplifier.

1.1.5 Tracking error amplifier

The photo-detector outputs E and F are passed through the differential amplifier and the error amplifier to obtain (E - F), and then provided from the pin 138 as the TE signal. The low frequency component of the voltage TE is calculated as below.

TEO = (E - F) x 63k / 112k x 160k / 160k x 181k / 45.4k x 160k / 80k

= (E - F) x 4.48

For the TE output, TE waveform of about 1.3 Vp-p with the REFO as the reference. The cutoff frequency in the subsequent is 21.1 kHz.

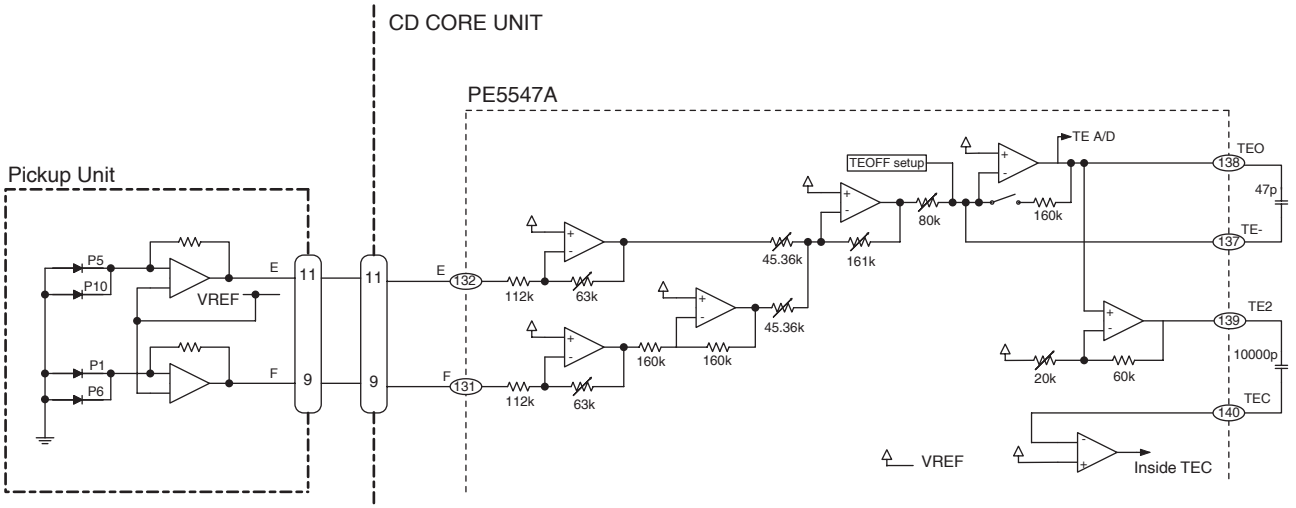


Fig.1.1.3 TE

1.1.6 Tracking zero-cross amplifier

The tracking zero-cross signal (hereinafter referred to as TEC signal) is obtained by amplifying the TE signal by fourfold, and used to detect the tracking-error zero-cross point. As the purpose of detecting the zero-cross point, the following two points can be named:

1. To use for track-counting in the carriage move and track jump modes
2. To use for detecting the direction in which the lens moves in tracking close. (Used in the tracking brake circuit to be explained later.)

The frequency range of the TEC signal is from 300 Hz to 20 kHz, and

TEC voltage = TE level x 4

The TEC level can be calculated at 4.62 V, which, at this level, exceeds the D range of the operational amplifier, and clips the signal, but, because the CD LSI only uses the signal at the zero-cross point, it poses no particular problem.

1.1.7 EFM circuit

The EFM circuit converts the RF signal into digital signals of 0 and 1. The AGCO signal output from the pin 119 is A/C-coupled externally, input to the pin 118, and supplied to the EFM circuit.

Missing RF signal due to scratches and stains on the disc, and asymmetry of the upper and lower parts of the RF, caused by variation in disc production, cannot be entirely eliminated in AC coupling process, the reference voltage ASY of the EFM comparator is controlled, using the probability that 0 and 1 occur at 50%. Thus, the comparator level will always stay around the center of the RFO signal. This reference voltage ASY is generated by passing the EFM comparator output through the low-pass filter. The EFM signal is output from the pin 113.

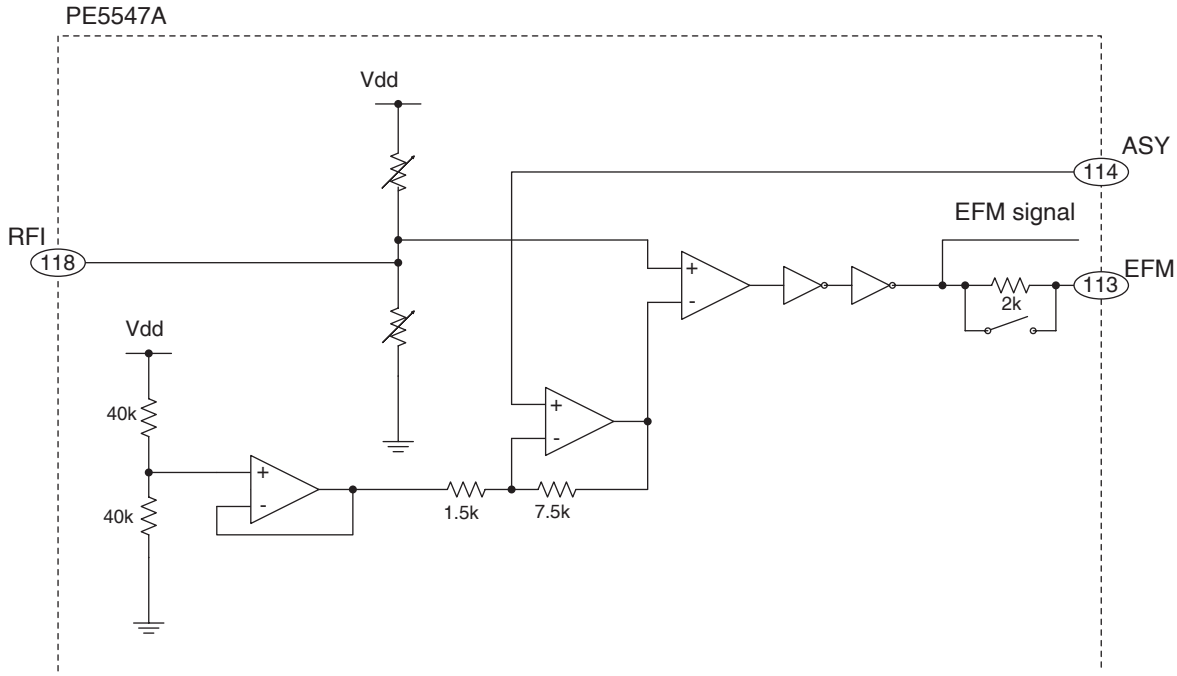


Fig.1.1.4 EFM

1.2 SERVO BLOCK (PE5547A: IC201)

The servo block performs servo control such as error signal equalizing, in-focus, track jump and carriage move. The DSP block is the signal-processing unit, where data decoding, error correction, and compensation are performed. The FE and TE signals, generated in the preamplifier stage, are A/D-converted, and output drive signals for the focus, tracking, and carriage systems via the servo block. Also, the EFM signal is decoded in the signal-processing unit, and ends up in outputting D/A-converted audio signals through the D/A converter. Furthermore, in this decoding process, the spindle servo error signal is generated, supplied to the spindle servo block, and used to output the spindle drive signal.

Each drive signal for focus, tracking, carriage, and spindle servos (FD, TD, SD, and MD) are output as PWM3 data, and then converted to analog data through the LPF. These drive signals, after changed to analog form, can be monitored with the FIN, TIN, CIN, and SIN signals, respectively. Subsequently, the signals are amplified and supplied to the actuator and motor for each signal.

1.2.1 Focus servo system

The main equalizer of the focus servo consists of the digital equalizer block. The figure 1.2.1 shows the block diagram of the focus servo system.

In the focus servo system, it is necessary to move the lens within the in-focus range in order to close the focus loop. For that purpose, the in-focus point is looked for by moving the lens up and down with the focus search voltage of triangular signal. During this time, the rotation of the spindle motor is retained at a certain set speed by kicking the spindle motor.

The servo LSI monitors the FE and RFOK signals and automatically performs the focus-close operations at an appropriate timing. The focus-close operation is performed when the following three conditions are satisfied at the same time:

1) The lens moves toward the disc surface.
2) RFOK = "H"
3) The FE signal is zero-crossed.

Consequently, the FE converges to "0" (= REFO).

When the above-mentioned conditions are met and the focus loop is closed, the FSS bit is shifted from "H" to "L," and then, in 10 ms, the CPU of the LSI starts monitoring the RFOK signal obtained through the low-pass filter.

If the RFOK signal is determined to be "L," the CPU of the LSI takes several actions including protection.

Fig.1.2.2 shows a series of actions concerning the focus close operations. (It shows a case where the focus loop cannot be closed.)

With the focus mode selector displaying 01 in the test mode, pressing the focus close button, allows to check the S-shaped curve, search voltage, and actual lens behavior.

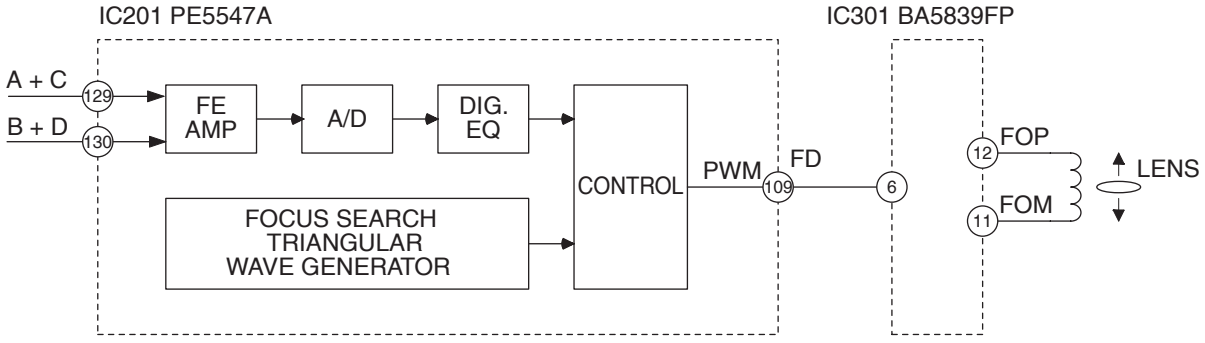


Fig.1.2.1 Block diagram of the focus servo system

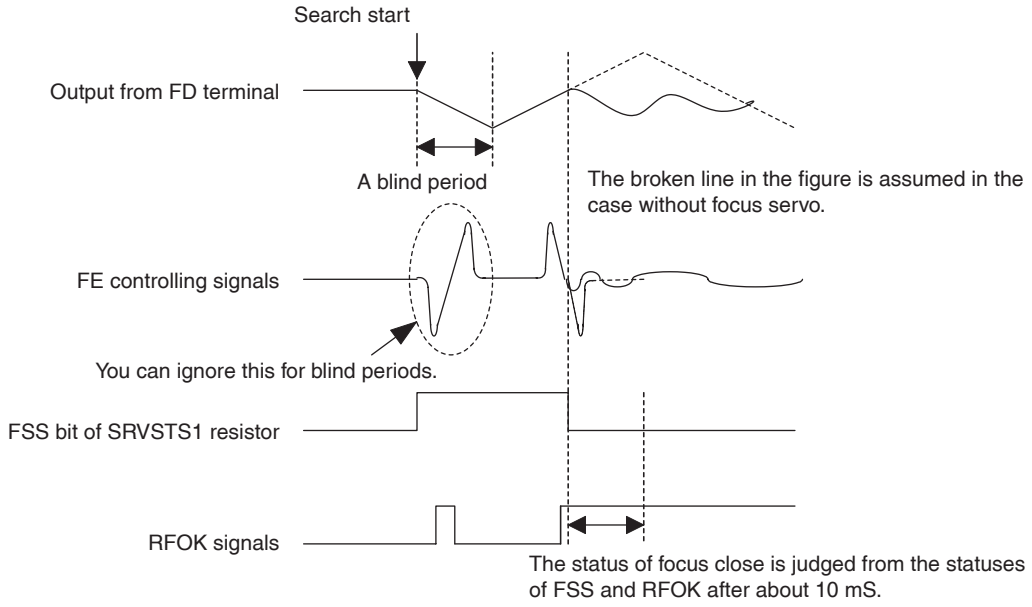

Search start
Output from FD terminal
A blind period
The broken line in the figure is assumed in the case without focus servo.
FE controlling signals
You can ignore this for blind periods.
FSS bit of SRVSTS1 resistor
RFOK signals
The status of focus close is judged from the statuses of FSS and RFOK after about 10 mS.

Fig.1.2.2 Timing chart for focus close operations

1.2.2 Tracking servo system

The main equalizer of the tracking servo consists of the digital equalizer block. The figure 1.2.3 shows the block diagram of the tracking servo system.

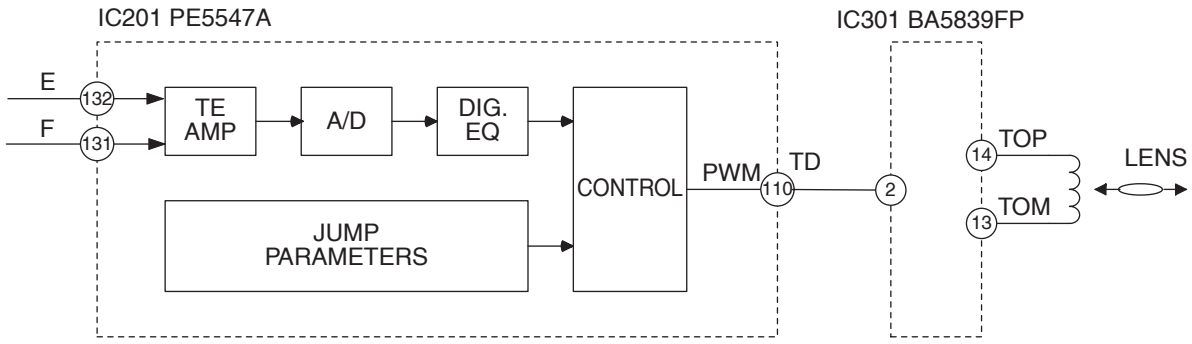


Fig.1.2.3 Block diagram of the tracking servo system

(a) The track jump operation is automatically performed by the auto-sequence function inside the LSI with a command from the CPU of the LSI. For the track jumps used in the search mode, a single track jump and four to 100 multi-track jump are available in this system. In the test mode, out of these track jumps, 1, 32, and 32 * 3 track jumps, as well as carriage move can be performed and checked in mode selection. In a track jump, the CPU of the LSI sets about half the number of the total tracks to jump (about five tracks for a 10-track jump), and the set number of tracks are counted using the TEC signal. By outputting the brake pulse for a certain period of time (set by the CPU of the LSI) from the time the set number is counted, and stopping the lens, the tracking loop can be closed so that the normal play can be continued.

Also, in order to facilitate closing of the tracking loop in a track jump, the brake circuit is kept ON for 50 msec, after the brake pulse is stopped, for increasing the tracking servo gain. The FF/REW action in the normal operation mode is realized by performing single jumps consecutively. The speed is approximately 10 times faster than in the normal mode.

(b) Brake circuit

Since the servo loop is not closed very well in the setup mode and track jump mode, the brake circuit is used for stabilizing the servo-loop close operation. The brake circuit detects the direction in which the lens moves, and outputs only the drive signal for the direction opposite to the movement to slow down the lens, thereby stabilizing the tracking servo-loop close operation. Additionally, the off-track direction is determined from the TEC and MIRR signals, as well as their phase relation.

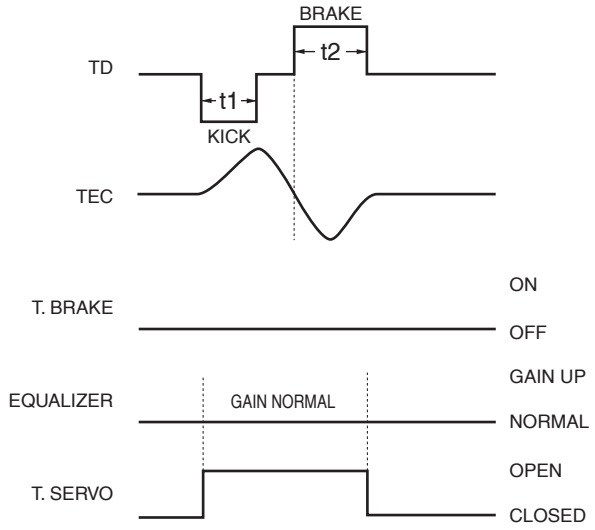


Fig.1.2.4 Single-track jump

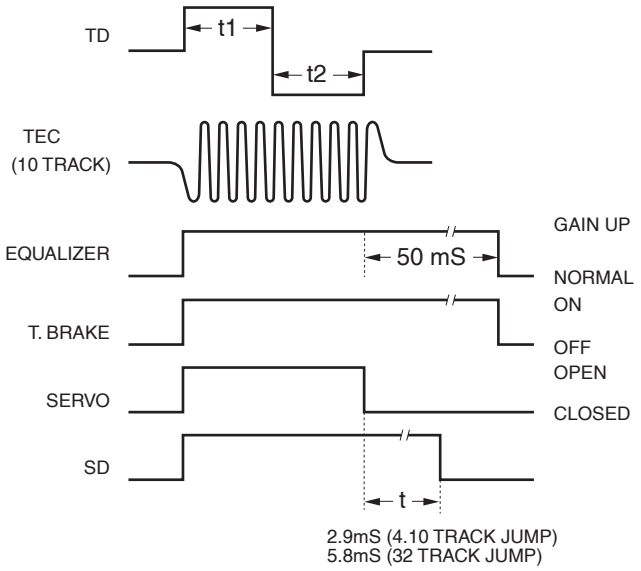
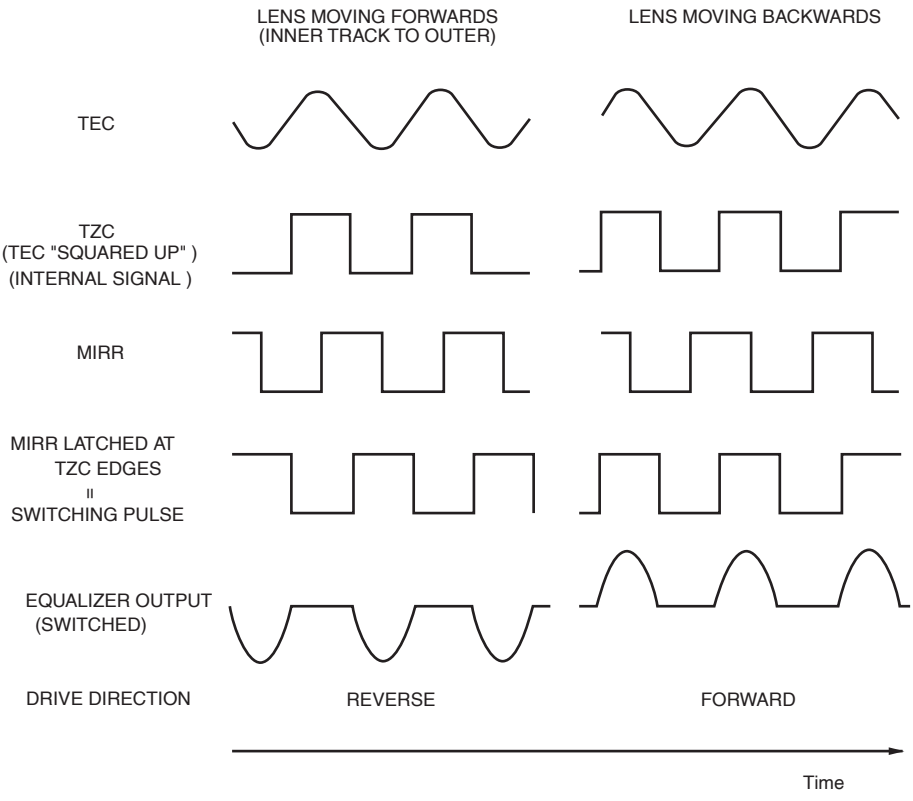


Fig.1.2.5 Multi-track jump



Note : Equalizer output assumed to hava same phase as TEC.

Fig.1.2.6 Track brake

1.2.3 Carriage servo system

The carriage servo system inputs the output of the low frequency component from the tracking equalizer (information on the lens position) to the carriage equalizer, and, after the gain is increased to a certain level, outputs the drive signal from the CD of the LSI. This signal is applied to the carriage motor via the driver IC.

Specifically, since it is necessary to move the whole pickup to the FORWARD direction when the lens offset reaches a certain level during the play mode, the equalizer gain is set to output higher voltage than the carriage motor starting voltage at this time. In actual operations, a certain threshold level is preset in the servo LSI for the equalizer output, and only when it exceeds the threshold level, the drive voltage will be output. This can reduce the power consumption. Also, before the whole pickup starts moving, the equalizer output voltage may exceed the threshold level a few times, due to such causes as eccentricity of discs. In this case, the output waveform of the drive voltage from the LSI assumes a pulse-like form.

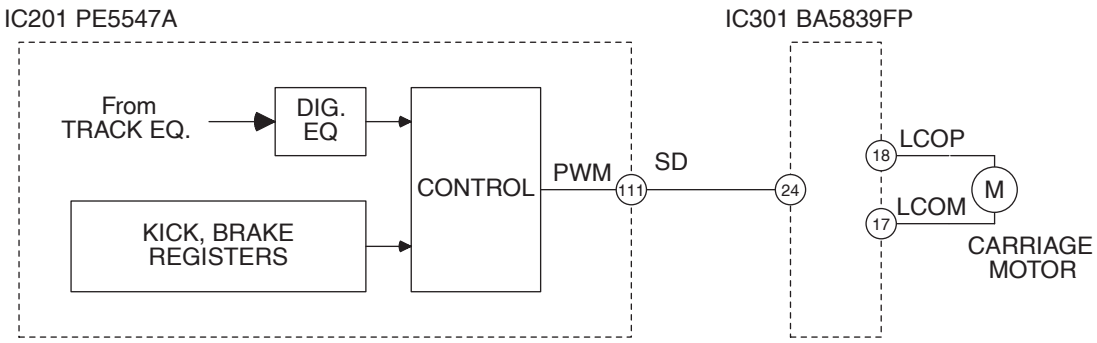


Fig.1.2.7 Block diagram for the carriage servo block

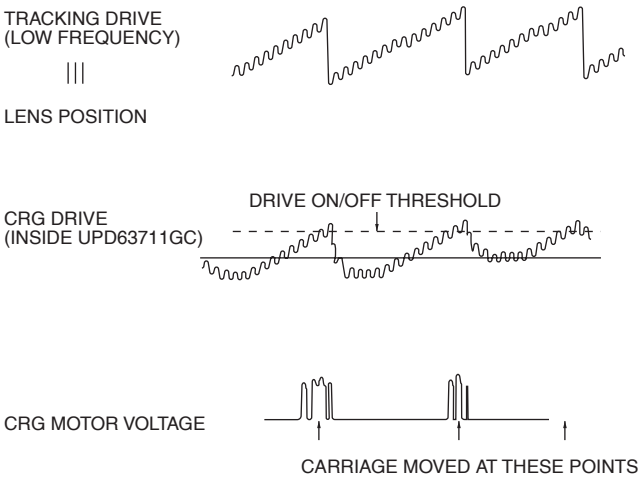


Fig.1.2.8 Waveforms of the carriage signal

1.2.4 Spindle servo system

In the spindle servo system, the following modes are available:

1) Kick

Used to accelerate the disc rotation in the setup mode.

2) Offset

a. Used in the setup mode after the kick mode, until the TBAL adjustment is completed.

b. Used during the play mode when the focus loop is unlocked, until it is locked again.

In both cases, the mode is used to keep the disc rotation approximately normal.

3) Applicable servo

CLV servo mode, used in the normal operation.

In the EFM demodulation block, by WFCK/16 sampling whether the frame sync signal and the internal frame counter output are synchronized, a signal is created to show if they are "in-sync" or "non-sync." The status is not recognized as asynchronous until the signal is "non-sync" for eight consecutive times; otherwise it is recognized as synchronous. In the applicable servo mode, the leading-in servo mode is automatically selected in the asynchronous status, and the normal servo mode in the synchronous status.

4) Brake

Used to stop the spindle motor.

In accordance with the CPU of the LSI command, the brake voltage is sent out from the servo LSI. At this time, the EFM waveform is monitored in the LSI, and when the longest EFM pattern exceeds a certain interval (or the rotation slows down enough), a flag is set inside the CD of the LSI, and the CPU of the LSI switches off the brake voltage. If a flag is not set within a certain period, the CPU of the LSI shifts the mode from the brake mode to the stop mode, and retains the mode for a certain period of time. If the mode switches to this stop mode in the eject operation, the disc will be ejected after the period of time mentioned above elapses.

5) Stop

Used when the power is turned on and during the eject operation. In the stop mode, the voltage in both ends of the spindle motor is 0 V.

6) Rough servo

Used in carriage feed (carriage move mode such as long search).

By obtaining the linear velocity from the EFM waveform, the "H" or "L" level is input to the spindle equalizer. In the test mode, this mode is also used for grating confirmation.

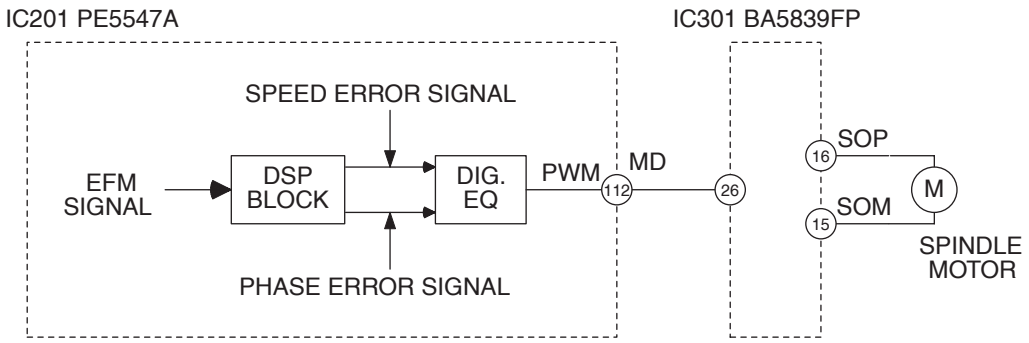


Fig.1.2.9 Block diagram of the spindle servo system

1.3 AUTOMATIC ADJUSTMENT FUNCTION

In this system, all the circuit adjustments are automated inside the CD of the LSI.
All adjustments are performed whenever a disc is inserted or the CD mode is selected by pressing the source key.
Details of each adjustment will be explained below.

1.3.1 TE, FE, and RF offset auto-adjustment

In this adjustment the TE, FE, and RF amplifier offsets of the preamplifier block in POWER ON are adjusted to the respective target values with the REFO as reference. (The target values for TE, FE, and RF offsets are 0 V, 0 V, and - 0.8 V, respectively.)

Adjusting procedure

1) The CPU of the LSI reads respective offsets through the CD of the LSI, when they are in LDOFF status.
2) The CPU of the LSI calculates the voltages for correction from the values read in 1), and substitutes the corrected values to prescribed places to adjust.

1.3.2 Tracking balance (T.BAL) auto-adjustment

This adjustment equalizes the output difference of the E-ch and F-ch from the pickup by changing the amplifier gain inside the CD of the LSI. In actual operation, adjustment is performed so that the TE waveform becomes symmetrical on each side of the REFO.

Adjusting procedure

1) After closing the focus loop,
2) Kick the lens in the radial direction to ensure the generation of the TE waveform.
3) The CPU of the LSI reads the offset amount of the TE signal calculated in the LSI at the time through the CD of the LSI.
4) The CPU of the LSI determines the offset amount is 0, positive, or negative.
- When the offset amount is 0, the adjustment is completed.
- When the offset amount is positive or negative, the amp gains for E-ch and F-ch should be changed, following a certain rule.

Then, steps 2) to 4) are repeated until the offset amount becomes 0 or the repetition reaches the limit number of times.

1.3.3 FE bias auto-adjustment

This adjustment is to maximizes the RFO level by optimizing the focus point during the play mode, utilizing the phase difference between the 3T level waveform of the RF waveform and that of when focus error disturbance is input. This adjustment is performed at the same timing as the auto-gain control, which will be described later, since disturbance is input to the focus loop.

Adjusting procedure

1) The CPU of the LSI issues the command to introduce disturbance to the focus loop (inside the CD of the servo LSI).
2) The waver of the 3T component of the RF signal is detected in the CD of the LSI.
3) The relation between the 3T component above and the disturbance is processed inside the CD of the LSI to detect the volume and direction of the focus offset.
4) The CPU of the LSI issues a command and reads out the detected results from the CD of the LSI.
5) The CPU of the LSI calculates the necessary correction and substitutes the result to the bias adjustment term inside the CD of the LSI.

Additionally, in this adjusting, a series of steps are repeated for better adjustment accuracy, the same as in the auto-gain control.

1.3.4 Focus and tracking AGC

This adjustment is to automatically adjust the focus and tracking servo loop gains.

Adjusting procedure

1) Introduce disturbance to the servo loop.

2) The error signals (FE and TE) when disturbance is introduced are extracted through the band pass filter, to obtain the G1 and G2 signals.

3) The CPU of the LSI reads the G1 and G2 signals through the CD of the LSI.

4) The CPU of the LSI calculates the necessary correction and performs the loop gain adjustment inside the CD of the LSI.

For increased adjustment accuracy, the same adjustment process is repeated a few times.

1.3.5 RF level auto-adjustment (RFAGC)

This adjustment is to adjust the dispersion of the RF level (RFO), which may be caused by mechanism or disc-related factors, to a steady value for reliable signal transmission. The adjustment is performed by changing the amp gain between RFO and RFAGC.

Adjusting procedure

1) The CPU of the LSI issues a command and reads out the output from the RF level detection circuit inside the CD of the LSI.

2) From the read values, the CPU of the LSI calculates the amp gain to change the RFO level to the target.

3) The CPU of the LSI sends a command to the CD of the LSI to adjust the amp gain to the level calculated in 2).

This adjustment is performed

1) when only the focus close operation is completed during the setup mode, and

2) immediately before the setup is completed (or when the play mode is about to start).

1.3.6 Adjustment of gains in preamplifier stage

In this adjustment, when reflected beams from the disc surface are extremely weak, such as when the lens is dirty, or a CD-RW is played, gains in the whole RFAMP block (FE, TE, and RF amplifiers) are increased by + 6 dB or + 12 dB, depending on the situation.

Adjusting procedure

When the system determines that the reflected beams from the disc surface are extremely weak during the setup mode, the whole RFAMP gains will be increased by + 6 dB or + 12 dB.

1.3.7 Initial values in adjustment

All automatic adjustments immediately after inserting a disc are performed based on the initial values. Automatic adjustments by source change or ACC ON are basically performed using the previous adjustment values as the initial values.

1.3.8 Coefficient display of adjustment results

For some of the adjustments (FE and RF offset, FZD cancel, F and T gains, and RFAGC), the adjustment results can be displayed and confirmed in the test mode.

The coefficient display in each auto adjustment is as follows:

1) FE and RF offset

Reference value = 32 (coefficient of 32 indicates that no adjustment is required)

The value is displayed in the unit of approximately 32 mV.

Ex. When the FE offset coefficient is 35,

35 - 32 = 3 x 32 mV = 96 mV

The correction is about +96 mV, which means the FE offset before adjustment is - 96 mV.

2) F and T gain adjustment

Reference value for focus and tracking = 20

The displayed coefficient / the reference value indicates the adjusted gain.

Ex. When the AGC coefficient is 40,

adjustment of 40 / 20 = 2 times (+ 6 dB) has been performed.

(It means that the original loop gain was half the target, and the whole gain was doubled to obtain the target value.)

3) RF level adjustment (RFAGC)

Reference value = 8

The coefficient of 9 to 15 indicates to increase the RF level

(for more gains).

The coefficient of 7 to 10 indicates to decrease the RF level

(for less gains).

When the coefficient changes by 1, the gain changes by 0.7 to 1 dB.

When the coefficient is 15, the gain is the maximum at TYP + 7.9 dB.

When the coefficient is 0, the gain is the minimum at TYP - 4.6 dB.

1.4 POWER SUPPLY AND LOADING BLOCK

For the power supply for this system, the VD (7.5 ± 0.5 V) and the VDD (3.3 ± 0.165 V), which are supplied from the motherboard, are used. The two power supplies, the VD mentioned above (for the drive system), and the VDD (for the LSI: 3.3 V), are used in this system.

The CPU of the LSI controls ON/OFF with "CONT", except for Load/Eject of the CD driver. For ON/OFF of the Loading drive, no particular control terminals are available, but the input signal "LOEJ" assumes an equivalent role. Also, the LCO output switches LOADING MODE and CARRIAGE MODE with "CLCONT".

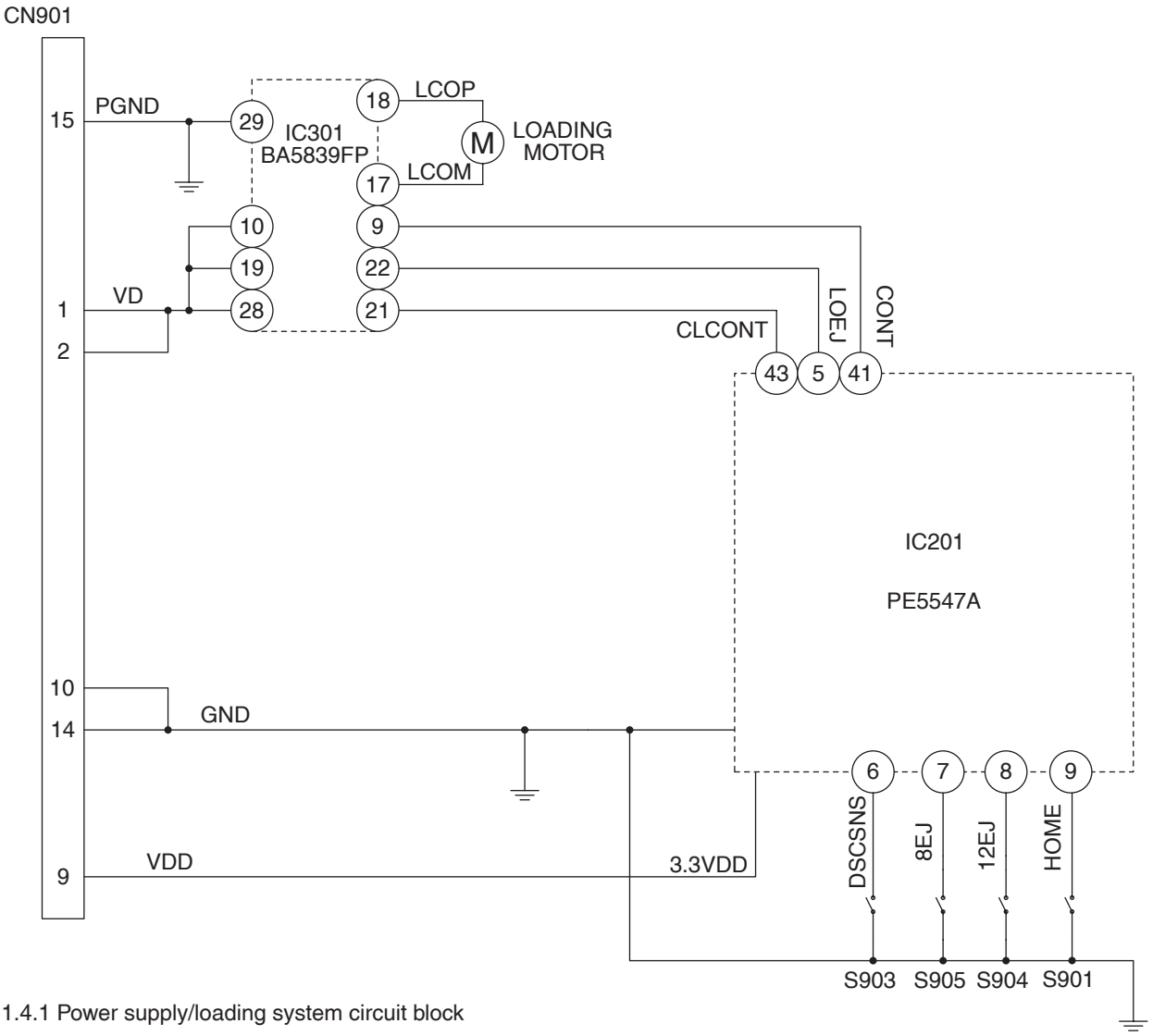


Fig.1.4.1 Power supply/loading system circuit block

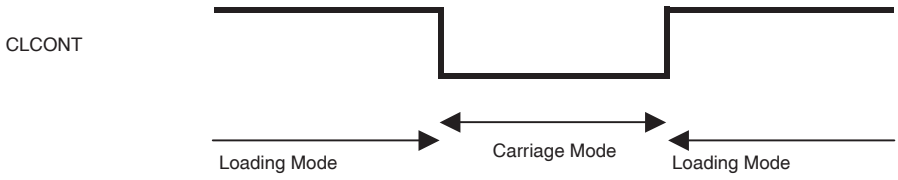


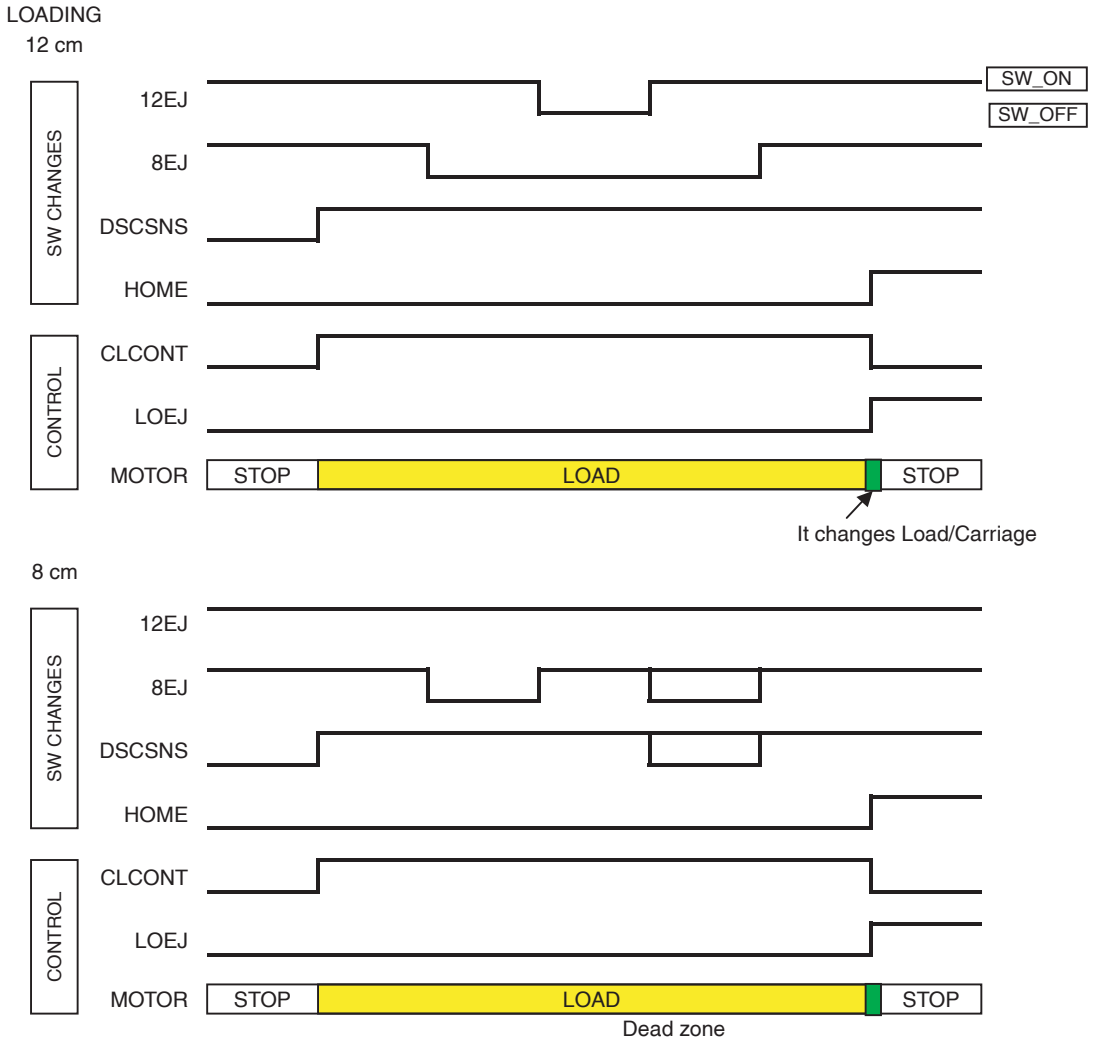
Fig.1.4.2 Loading/carriage mode shift

The load/eject operation is controlled with the status changes of the HOME switch (also used for clamp detection) on the mechanism unit and the three switches on the control unit. The ON/OFF statuses of these switches are respectively detected at the input port of the microcomputer.

Using the detection results in the microcomputer, each status (A to E) is determined. The disc size detection (8 or 12 cm) is also performed through this status change. Each status is shown in Fig.1.4.3 and the status change in Fig.1.4.4.

	Status	A	B	C	D	E
DSCSNS	SW1(S903)	OFF	ON	ON	ON	ON
8SW	SW2(S905)	ON	ON	OFF	OFF	ON
12SW	SW3(S904)	ON	ON	ON	OFF	ON
HOME	SW4(S901)	OFF	OFF	OFF	OFF	ON
	Mechanism state	With no disc				Clamp state

Fig.1.4.3 DSCSNS status



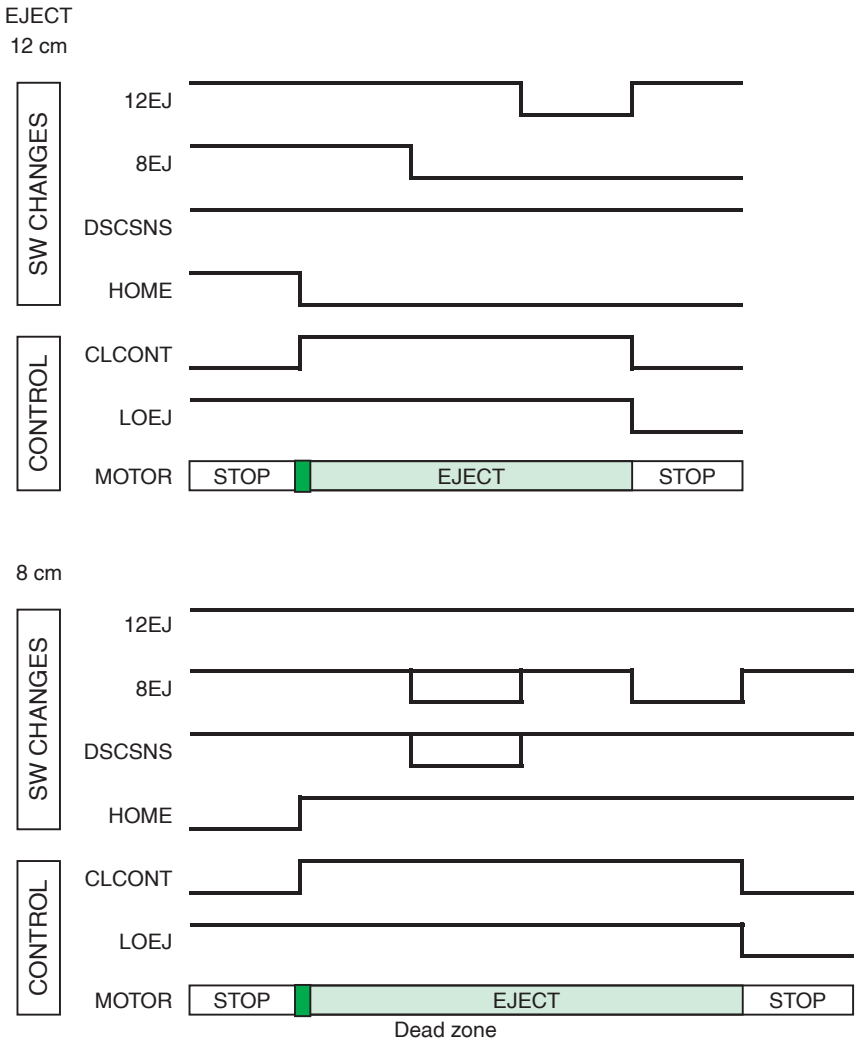
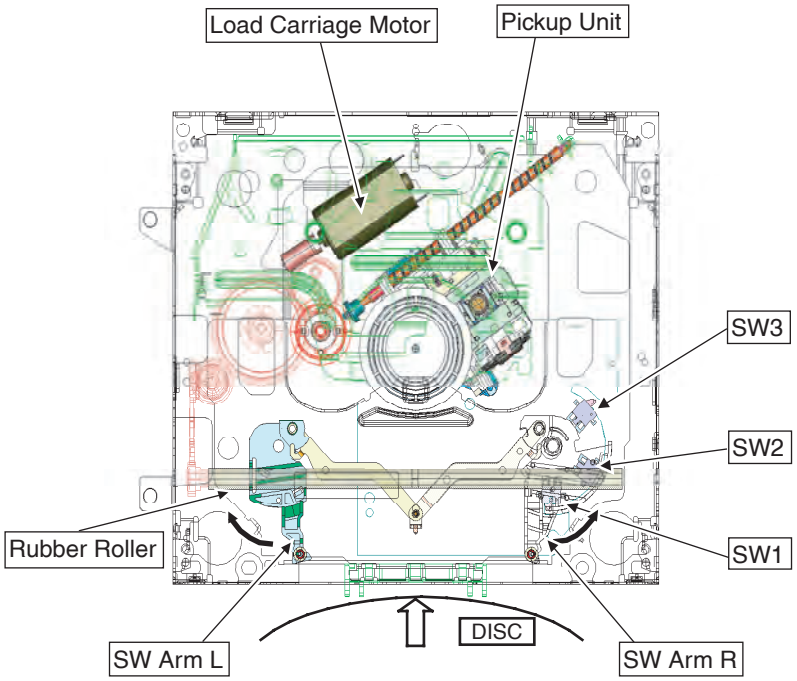


Fig.1.4.4 Status change in LOAD and EJECT modes

2. MECHANISM DESCRIPTIONS

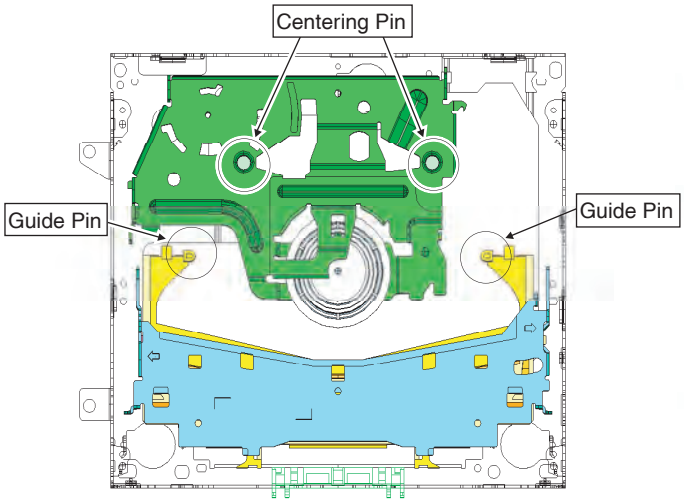
● Loading actions

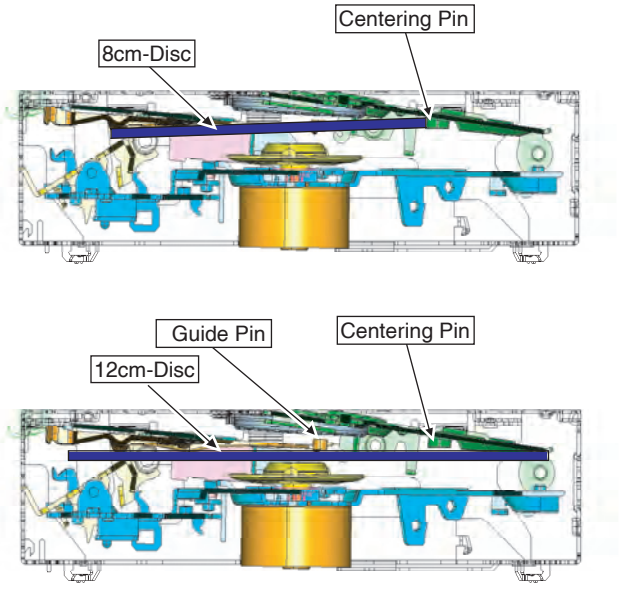
1. When a disc is inserted, SW Arm L and R rotate and SW1 is switched from ON to OFF.
   When SW1 is switched from ON to OFF, the Load Carriage Motor is started and the rubber roller rotates.
2. If the disc is a 12cm-disc, SW3 is turned ON with SW Arm, and the microcomputer determines that the disc is a 12cm-disc.
3. In case of an 8cm-disc, SW3 is not turned ON, a clamp action is triggered, and the microcomputer determines that the disc is an 8cm-disc.
   (The left and right of SW Arm are coupled, and when only one side is pushed, the coupled joint will lock, and the arms will not open more than a certain width (SW3 will not be turned ON).)



● Disc centering mechanism

1. 8cm-disc is centered by the Guide Pins and the Centering Pins.
2. 12cm-disc passes under the Guide Pins and the Centering Pins, and centered in the back position of the mechanism.





● Clamp actions mechanism

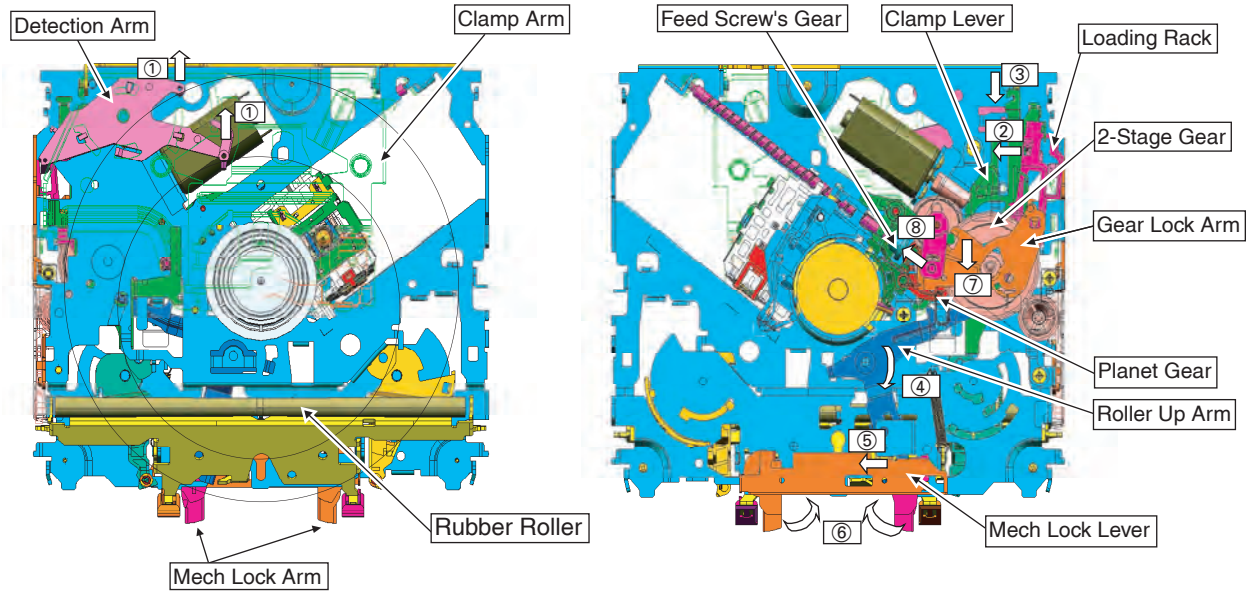
1. With an 8 or 12cm-disc centered on the spindle, the Detection Arm is moved.
2. The movement of the Detection Arm engages the Loading Rack with the 2-Stage Gear.
3. The Clamp Lever slides and lowers the Clamp Arm (the disc is clamped).

At the same time, the Roller Up Arm is rotated, and the Rubber Roller is separated from the disc.

Also the arm slides the Mechanical Lock Lever, turns the Mechanical Lock Arm, and releases the mechanical lock, completing the clamp operation.

4. When the clamp action is completed, the Clamp Lever rotates the Gear Lock Arm.

When the arm is rotated, the Planet Gear is separated from the 2-Stage Gear and engaged with the gear of the pickup feed screw, and the carriage operation will start



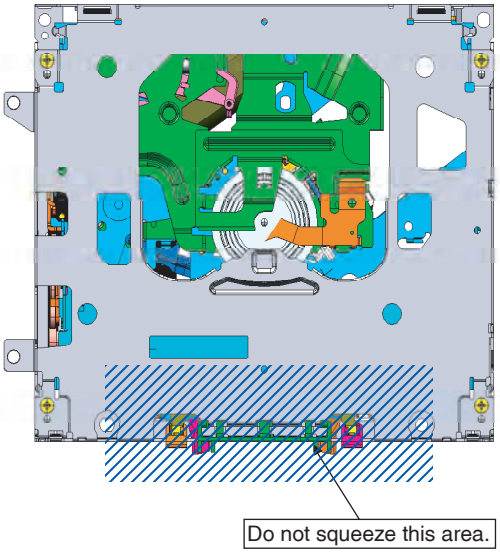
● Eject actions

1. When the Load Carriage Motor is rotated backward, and the pickup is fed to the inner periphery passing the home SW ON point, the eject action will start in the reverse order of the procedure mentioned earlier.
2. For a 12cm-disc, Eject is completed when SW3 is switched OFF, ON, and OFF again.
3. For an 8cm-disc, Eject is completed when SW2 is switched OFF, ON, and OFF again.

3. DISASSEMBLY

● How to hold the Mechanism Unit

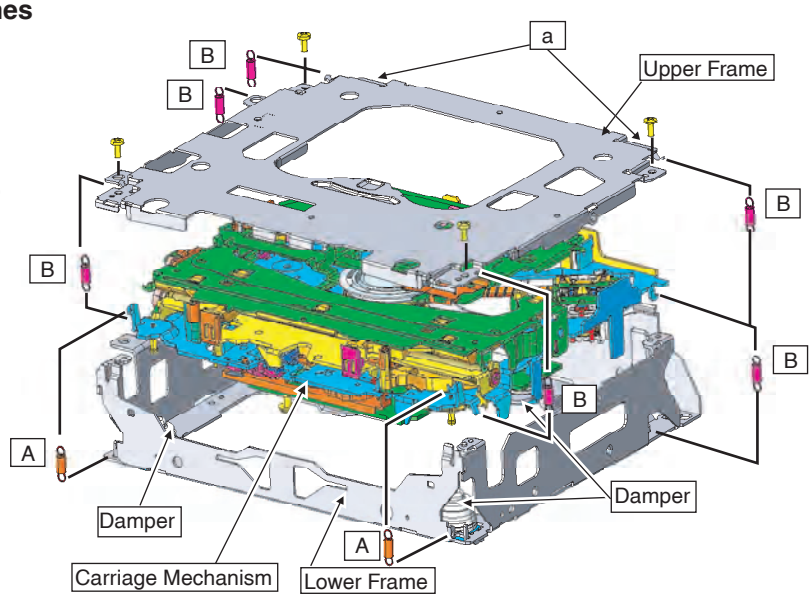
1. Hold the Upper and Lower Frames.
2. Do not hold the front portion of the Upper Frame, because it is not very solid.



● Removing the Upper and Lower Frames

1. With a disc inserted and clamped in the mechanism, remove the two Springs (A), the six Springs (B), and the four Screws.
2. Turn the Upper Frame using the part "a" as a pivot, and remove the Upper Frame.
3. While lifting the Carriage Mechanism, remove it from the three Dampers.

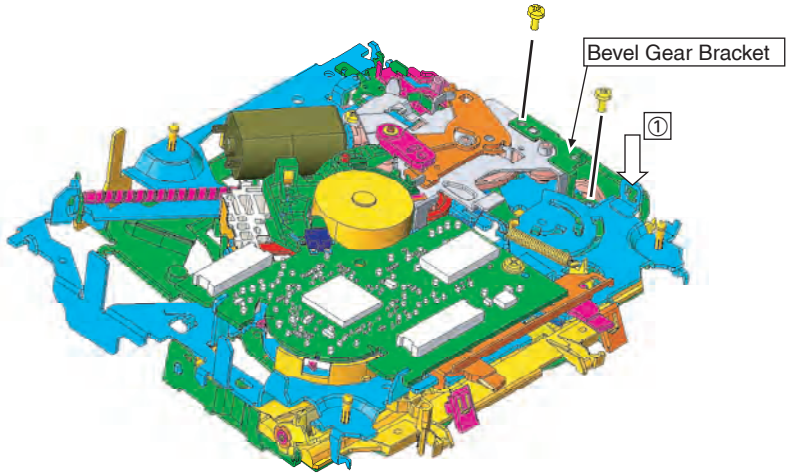
Caution: When assembling, be sure to apply some alcohol to the Dampers and assemble the mechanism in a clamped state.

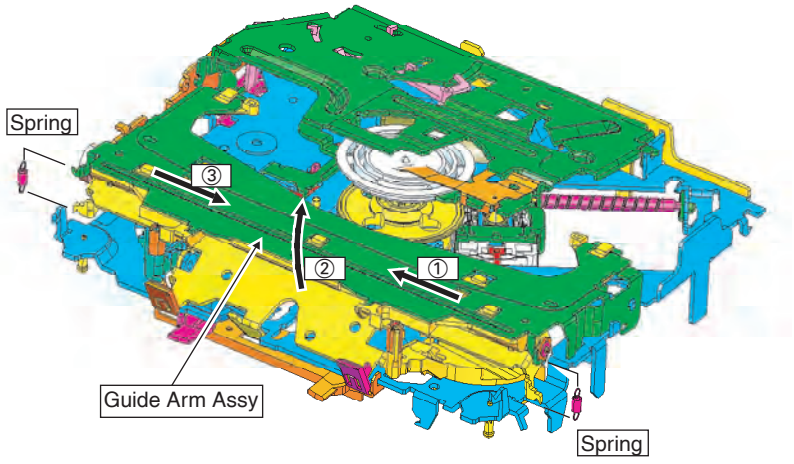


● Removing the Guide Arm Assy

1. Remove the Upper and Lower Frames and set the mechanism to the eject mode.
2. Remove the two Screws and Bevel Gear Bracket. (Note that the gears will come off.)
3. Remove the two Springs from the left and right sides.
4. Slide the Guide Arm Assy to the left, and turn it upward.
5. When it is turned about 45 degrees, slide it to the right and remove.

Caution: When assembling, assemble with the Bevel Gear Bracket moved to the direction of the arrow (①).

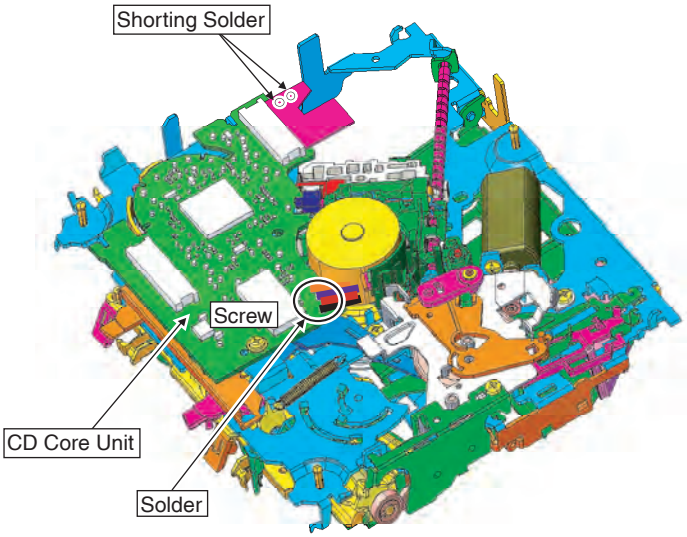




● How to remove the CD Core Unit

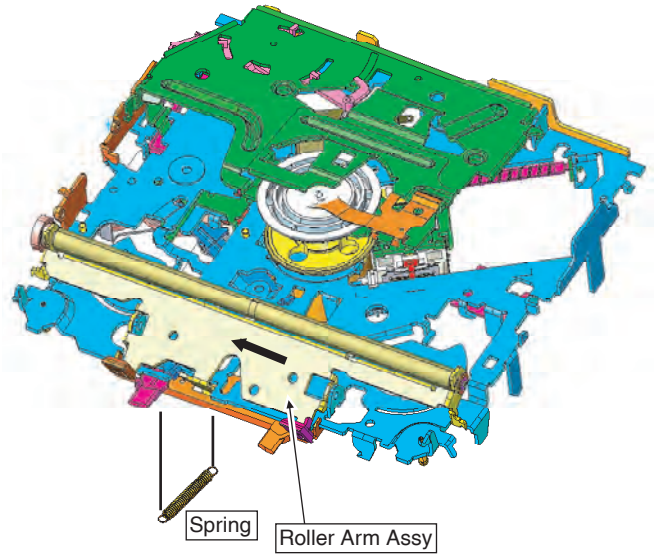
1. Apply Shorting Solder to the flexible cable of the Pickup, and disconnect it from the connector.
2. Unsolder the four leads, and loosen the Screw.
3. Remove the CD Core Unit.

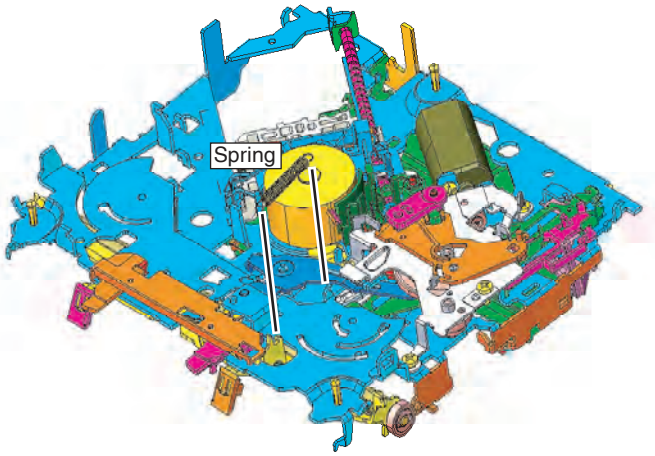
Caution: When assembling the CD Core Unit, assemble it with the SW in a clamped state so as not to damage it.



● How to remove the Roller Arm Assy

1. Remove the Guide Arm Assy.
2. Remove the CD Core Unit. (If the Spring can be removed, the unit need not be removed, depending on the type of CD Core Unit.)
3. Remove the Spring.
4. Slide the Roller Arm Assy to the left.



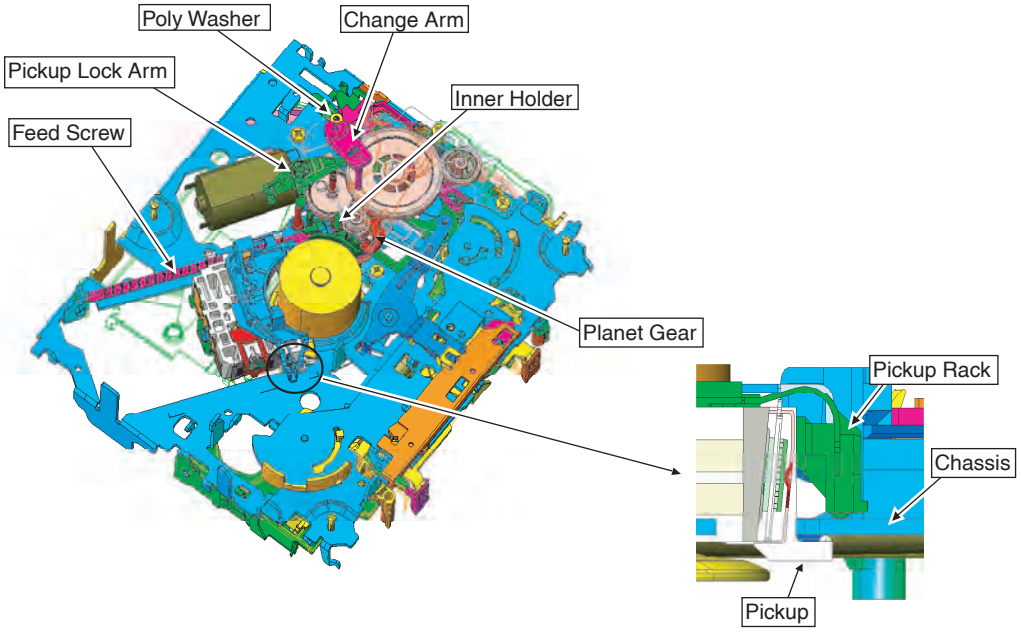


● How to remove the Pickup Unit

1. Make the system in the carriage mechanism mode, and have it clamped.
2. Remove the CD Core Unit and remove the leads from the Inner Holder.
3. Remove the Poly Washer, Change Arm, and Pickup Lock Arm.
4. While releasing from the hook of the Inner Holder, lift the end of the Feed Screw.

Caution: When assembling, move the Planet Gear to the load/eject position before setting the Feed Screw in the Inner Holder.

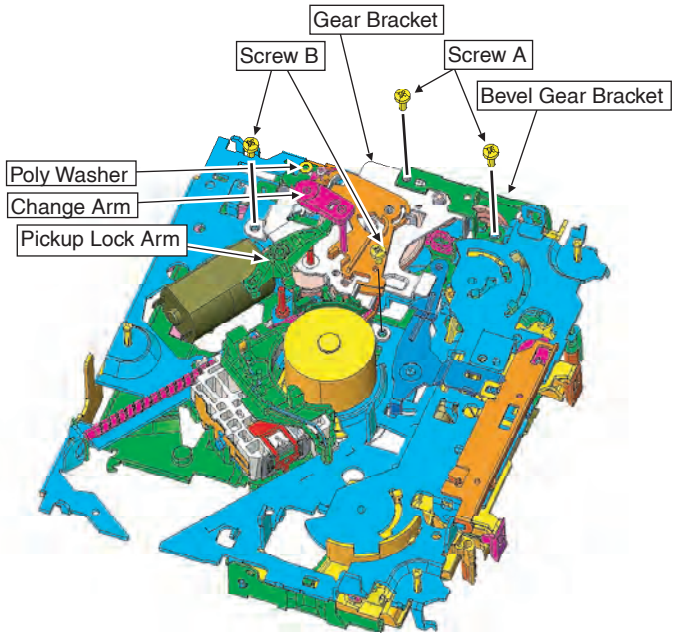
Assemble the sub unit side of the Pickup, taking the plate (Chassis) in-between. When treating the leads of the Load Carriage Motor Assy, do not make them loose over the Feed Screw.

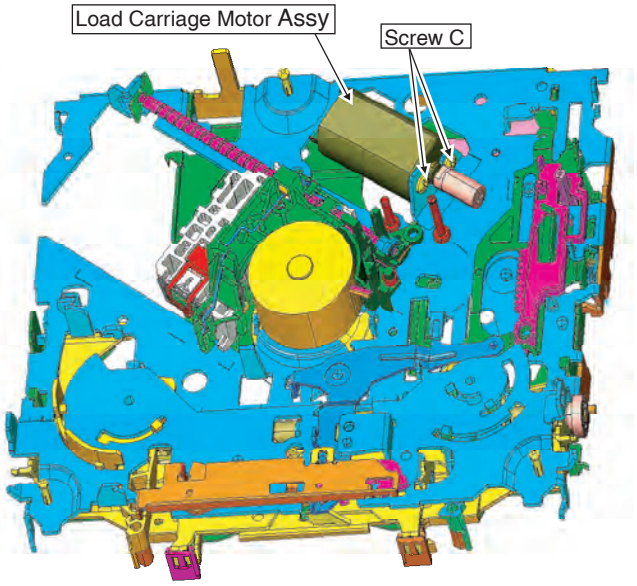


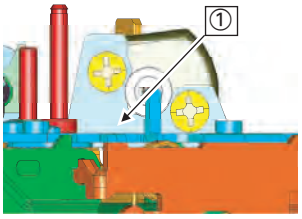
● How to remove the Load Carriage Motor Assy

1. Make the system in the carriage mechanism mode, and have it clamped.
2. Release the leads (orange and purple) of Load Carriage Motor Assy from the CD Core Unit and remove the holder.
3. Remove the Poly Washer, Change Arm, and Pickup Lock Arm.
4. Remove the two Screws (A) and the Bevel Gear Bracket (Note that the gears will come off).
5. Remove the two Screws (B) and the Gear Bracket (remove the CD Core Unit, if necessary), and remove all the gears.
6. Remove the two Screws (C) and the Load Carriage Motor Assy.

Caution: When assembling the Load Carriage Motor Assy, move it to the direction shown in the illustration (①).
When treating the leads of the Load Carriage Motor Assy, do not make them loose over the Feed Screw.



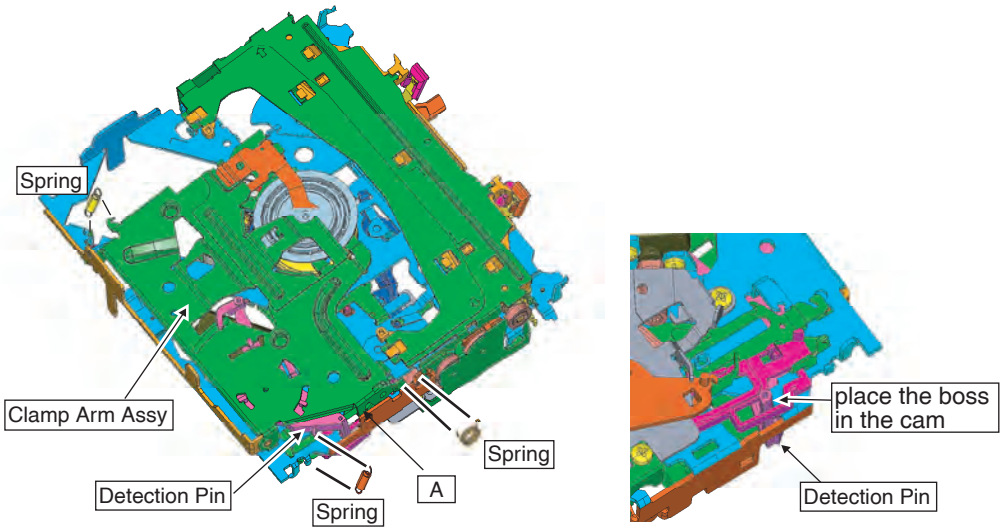




● How to remove the Clamp Arm Assy

1. Make the system in the carriage mechanism mode, and set the mechanism to the eject mode.
2. Remove the three Springs.
3. While pressing the position A, turn the Clamp Arm Assy upward, slide it to the left, and remove.

Caution: When assembling, place the boss of the Detection Pin in the cam unit of the Loading Rack.



● How to remove the Spindle Motor Assy

1. Make the system in the carriage mechanism mode, and have it clamped.
2. Remove the CD Core Unit and remove the leads from the Inner Holder.
3. Set the mechanism to the eject mode and remove the Clamp Arm Assy.
4. Set the mechanism to the clamped and move the Pickup to circumference.
5. Remove the two Screws, and remove the Spindle Motor Assy.